

OM-217 168 808K

October 2004

Processes



Air Plasma Cutting and Gouging

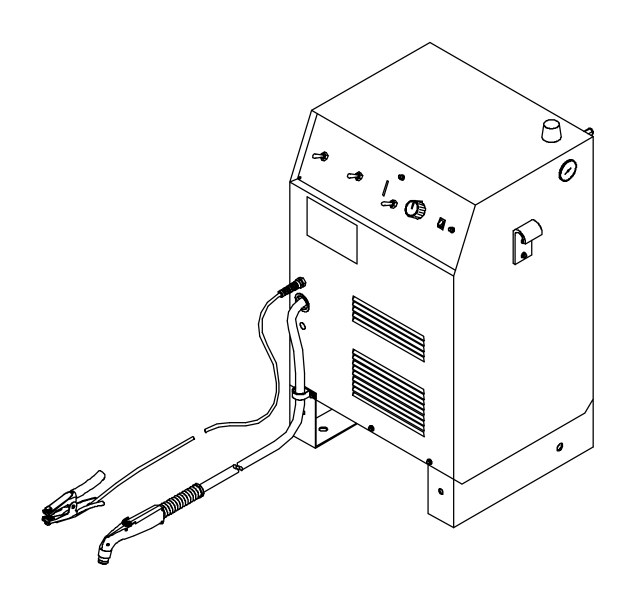
Description





Air Plasma Cutter

Spectrum® 1250





OWNER'S MANUAL



Visit our website at

www.MillerWelds.com

From Miller to You

Thank you and *congratulations* on choosing Miller. Now you can get the job done and get it done right. We know you don't have time to do it any other way.

That's why when Niels Miller first started building arc welders in 1929, he made sure his products offered long-lasting value and superior quality. Like you, his customers couldn't afford anything less. Miller products had to be more than the best they could be. They had to be the best you could buy.

Today, the people that build and sell Miller products continue the tradition. They're just as committed to providing equipment and service that meets the high standards of quality and value established in 1929.

This Owner's Manual is designed to help you get the most out of your Miller products. Please take time to read the Safety precautions. They will help you protect yourself against potential hazards on the worksite. We've made installation and operation quick and easy. With Miller you can count on years of reliable service with proper maintenance. And if for some reason the unit needs repair, there's a Troubleshooting section that will help you figure out what the problem is. The parts list will then help you to decide the exact part you may need to fix the problem. Warranty and service information for your particular model are also provided.



Miller is the first welding equipment manufacturer in the U.S.A. to be registered to the ISO 9001:2000 Quality System Standard.

Miller Electric manufactures a full line of welders and welding related equipment. For information on other quality Miller products, contact your local Miller distributor to receive the latest full line catalog or individual catalog sheets. **To locate your nearest distributor or service agency call 1-800-4-A-Miller, or visit us at www.MillerWelds.com on the web.**

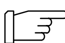


Working as hard as you do – every power source from Miller is backed by the most hassle-free warranty in the business.



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Declaration of Conformity for European Community (CE) Products

NOTE 	*This information is provided for units with CE certification (see rating label on unit).*

Manufacturer's Name: Miller Electric Mfg. Co.

Manufacturer's Address: 1635 W. Spencer Street
Appleton, WI 54914 USA

Declares that the product: **Spectrum® 1250**

conforms to the following Directives and Standards:

Directives

Low Voltage Directive: 73/23/EEC

Electromagnetic Compatibility Directives: 89/336/EEC, 92/31/EEC

Machinery Directives: 98/37/EEC, 91/368/EEC, 92/31/EEC, 133/04, 93/68/EEC

Standards

Arc Welding Equipment, Plasma Cutting Systems: prEN 50192: 1995

Arc Welding Equipment – Part 1: Welding Power Sources. IEC 60974-1 Ed. 2.1

Degrees Of Protection Provided By Enclosures (IP Code): IEC 60529: Ed. 2.1

Plasma Cutting Systems For Manual Use: EN 50192: 1995

Insulation Coordination For Equipment Within Low Voltage Systems – Part 1: Principles, Requirements And Tests. IEC 60664-1 Ed. 1.1

Arc Welding Equipment – Part 10: Electromagnetic Compatibility (EMC) Requirements. IEC 60974-10 August 2002

Additional Standards (Writer: Delete additional standards not applicable)

Arc Welding Equipment – Part 2: Liquid Cooling Systems. IEC 60974-2 Ed. 1

Arc Welding Equipment – Part 3: Arc Striking And Stabilizing Devices. IEC 60974-3 Ed. 1

Arc Welding Equipment – Part 5: Wire Feeders. IEC 60974-5 Ed. 1

Arc Welding Equipment – Part 7: Torches. IC 60974-7 Ed.1

European Contact: Mr. Danilo Fedolfi, Managing Director
ITW WELDING PRODUCTS ITALY S.r.l.
Via Privata Iseo 6/E
20098 San Giuliano
Milanese, Italy

Telephone: 39(02)98290-1
Fax: 39(02)98290-203

SECTION 1 – SAFETY PRECAUTIONS - READ BEFORE USING

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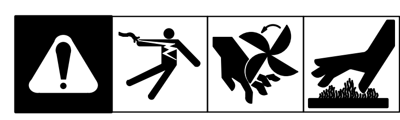
1-1. Symbol Usage



Means Warning! Watch Out! There are possible hazards with this procedure! The possible hazards are shown in the adjoining symbols.

▲ **Marks a special safety message.**

☞ *Means "Note"; not safety related.*



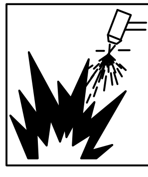
This group of symbols means Warning! Watch Out! possible ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.

1-2. Plasma Arc Cutting Hazards

▲ **The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1-5. Read and follow all Safety Standards.**

▲ **Only qualified persons should install, operate, maintain, and repair this unit.**

▲ **During operation, keep everybody, especially children, away.**



CUTTING can cause fire or explosion.

Hot metal and sparks blow out from the cutting arc. The flying sparks and hot metal, hot workpiece, and hot equipment can cause fires and burns. Check and be sure the area is safe before doing any cutting.

- Protect yourself and others from flying sparks and hot metal.
- Do not cut where flying sparks can strike flammable material.
- Remove all flammables within 35 ft (10.7 m) of the cutting arc. If this is not possible, tightly cover them with approved covers.
- Be alert that sparks and hot materials from cutting can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that cutting on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not cut on closed containers such as tanks or drums.
- Connect work cable to the work as close to the cutting area as practical to prevent cutting current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
- Never cut containers with potentially flammable materials inside – they must be emptied and properly cleaned first.
- Do not cut in atmospheres containing explosive dust or vapors.
- Do not cut pressurized cylinders, pipes, or vessels.
- Do not cut containers that have held combustibles.
- Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Do not locate unit on or over combustible surfaces.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any cutting.



ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The torch and work circuit are electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. Plasma arc cutting requires higher voltages than welding to start and maintain the arc (200 to 400 volts dc are common), but also uses torches designed with safety interlock systems which turn off the machine when the shield cup is loosened or if tip touches electrode inside the nozzle. Incorrectly installed or improperly grounded equipment is a hazard.

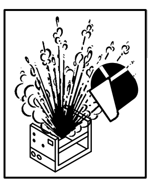
- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not touch torch parts if in contact with the work or ground.
- Turn off power before checking, cleaning, or changing torch parts.
- Disconnect input power before installing or servicing this equipment. Lockout/tagout input power according to OSHA CFR 1910.147 (see Safety Standards).
- Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
- Check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet – always verify the supply ground.
- When making input connections, attach proper grounding conductor first.
- Frequently inspect input power cord for damage or bare wiring – replace cord immediately if damaged – bare wiring can kill.
- Turn off all equipment when not in use.
- Inspect and replace any worn or damaged torch cable leads.
- Do not wrap torch cable around your body.
- Ground the workpiece to a good electrical (earth) ground if required by codes.
- Use only well-maintained equipment. Repair or replace damaged parts at once.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Do not bypass or try to defeat the safety interlock systems.
- Use only torch(es) specified in Owner's Manual.
- Keep away from torch tip and pilot arc when trigger is pressed.
- Clamp work cable with good metal-to-metal contact to workpiece (not piece that will fall away) or worktable as near the cut as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.



ELECTRIC SHOCK can kill.

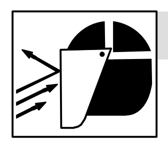
SIGNIFICANT DC VOLTAGE exists on internal parts of inverter power sources AFTER the removal of input power.

- Turn Off unit, disconnect input power, check voltage on input capacitors, and be sure it is near zero (0) volts before touching any parts. Check capacitors according to instructions in Maintenance Section of Owner's Manual or Technical Manual before touching any parts.



EXPLODING PARTS can injure.

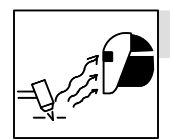
- On inverter power sources, failed parts can explode or cause other parts to explode when power is applied. Always wear a face shield and long sleeves when servicing inverters.



FLYING SPARKS can cause injury.

Sparks and hot metal blow out from the cutting arc. Chipping and grinding cause flying metal.

- Wear approved face shield or safety goggles with side shields.
- Wear proper body protection to protect skin.
- Wear flame-resistant ear plugs or ear muffs to prevent sparks from entering ears.



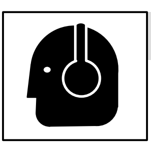
ARC RAYS can burn eyes and skin.

Arc rays from the cutting process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin.

- Wear face protection (helmet or shield) with correct shade of filter to protect your face and eyes when cutting or watching. ANSI Z49.1 (see Safety Standards) suggests a No. 9 shade (with No. 8 as minimum) for all cutting currents less than 300 amperes. Z49.1 adds that lighter filter shades may be used when the arc is hidden by the workpiece. As this is normally the case with low current cutting, the shades suggested in Table 1 are provided for the operator's convenience.
- Wear approved safety glasses with side shields under your helmet or shield.
- Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
- Wear protective clothing made from durable, flame-resistant material (leather and wool) and foot protection.

Table 1. Eye Protection For Plasma Arc Cutting

Current Level In Amperes	Minimum Shade Number
Below 20	#4
20 – 40	#5
40 – 60	#6
60 – 80	#8



NOISE can damage hearing.

Prolonged noise from some cutting applications can damage hearing if levels exceed limits specified by OSHA (see Safety Standards).

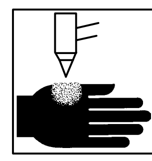
- Use approved ear plugs or ear muffs if noise level is high.
- Warn others nearby about noise hazard.



FUMES AND GASES can be hazardous.

Cutting produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

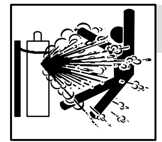
- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use exhaust at the arc to remove cutting fumes and gases.
- If ventilation is poor, use an approved air-supplied respirator.
- Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instruction for metals to be cut, coatings, and cleaners.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Fumes from cutting and oxygen depletion can alter air quality causing injury or death. Be sure the breathing air is safe.
- Do not cut in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not cut on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the cutting area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes when cut.
- Do not cut containers with toxic or reactive materials inside or containers that have held toxic or reactive materials – they must be emptied and properly cleaned first.



PLASMA ARC can cause injury.

The heat from the plasma arc can cause serious burns. The force of the arc adds greatly to the burn hazard. The intensely hot and powerful arc can quickly cut through gloves and tissue.

- Keep away from the torch tip.
- Do not grip material near the cutting path.
- The pilot arc can cause burns – keep away from torch tip when trigger is pressed.
- Wear proper flame-retardant clothing covering all exposed body areas.
- Point torch away from your body and toward work when pressing the torch trigger – pilot arc comes on immediately.
- Turn off power source and disconnect input power before disassembling torch or changing torch parts.
- Use only torch(es) specified in the Owner's Manual.



CYLINDERS can explode if damaged.

Gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of metalworking processes, be sure to treat them carefully.

- Protect compressed gas cylinders from excessive heat, mechanical shocks, slag, open flame, sparks, and arcs.
- Install and secure cylinders in an upright position by chaining them to a stationary support or equipment cylinder rack to prevent falling or tipping.
- Keep cylinders away from any cutting or other electrical circuits.
- Never allow electrical contact between a plasma arc torch and a cylinder.
- Never cut on a pressurized cylinder – explosion will result.
- Use only correct gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.

1-3. Additional Symbols For Installation, Operation, And Maintenance



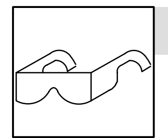
HOT PARTS can cause severe burns.

- Do not touch hot parts bare handed.
- Allow cooling period before working on torch.



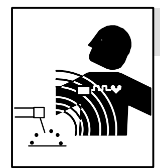
MOVING PARTS can cause injury.

- Keep away from moving parts such as fans.
- Keep all doors, panels, covers, and guards closed and securely in place.



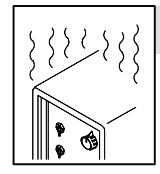
FLYING METAL can injure eyes.

- Wear safety glasses with side shields or face shield.



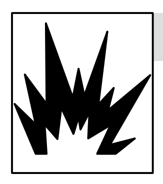
MAGNETIC FIELDS can affect pacemakers.

- Pacemaker wearers keep away.
- Wearers should consult their doctor before going near plasma arc cutting operations.



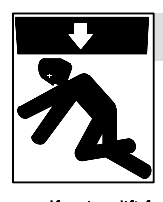
OVERUSE can cause OVERHEATING.

- Allow cooling period; follow rated duty cycle.
- Reduce amperage (thickness) or reduce duty cycle before starting to cut again.



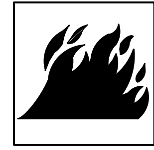
EXPLODING HYDROGEN hazard.

- When cutting aluminum underwater or with the water touching the underside of the aluminum, free hydrogen gas may collect under the workpiece.
- See your cutting engineer and water table instructions for help.



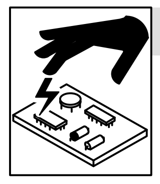
FALLING UNIT can cause injury.

- Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.
- Use equipment of adequate capacity to lift unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.



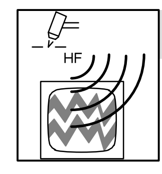
FIRE OR EXPLOSION hazard.

- Do not locate unit on, over, or near combustible surfaces.
- Do not install unit near flammables.
- Do not overload building wiring – be sure power supply system is properly sized, rated, and protected to handle this unit.



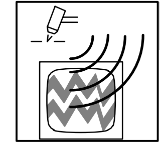
STATIC (ESD) can damage PC boards.

- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.



H.F. RADIATION can cause interference.

- High frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.



ARC CUTTING can cause interference.

- Electromagnetic energy can interfere with sensitive electronic equipment such as computers and computer-driven equipment such as robots.
- To reduce possible interference, keep cables as short as possible, close together, and down low, such as on the floor.
- Locate cutting operation 100 meters from any sensitive electronic equipment.
- Be sure this cutting power source is installed and grounded according to this manual.
- If interference still occurs, the user must take extra measures such as moving the machine, using shielded cables, using line filters, or shielding the work area.

1-4. California Proposition 65 Warnings

▲ **Welding or cutting equipment produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)**

▲ **Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.**

For Gasoline Engines:

▲ **Engine exhaust contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.**

For Diesel Engines:

▲ **Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.**

1-5. Principal Safety Standards

Safety in Welding and Cutting, ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami FL 33126

Safety and Health Standards, OSHA 29 CFR 1910, from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Practices for Plasma Arc Cutting, American Welding Society Standard AWS C5.2, from American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Code for Safety in Welding and Cutting, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3.

S*afe Practices For Occupation And Educational Eye And Face Protection*, ANSI Standard Z87.1, from American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting And Welding Processes, NFPA Standard 51B, from National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

1-6. EMF Information

Considerations About Welding Or Cutting And The Effects Of Low Frequency Electric And Magnetic Fields

Welding or cutting current, as it flows through the welding or cutting cables, will cause electromagnetic fields. There has been and still is some concern about such fields. However, after examining more than 500 studies spanning 17 years of research, a special blue ribbon committee of the National Research Council concluded that: “The body of evidence, in the committee’s judgment, has not demonstrated that exposure to power-frequency electric and magnetic fields is a human-health hazard.” However, studies are still going forth and evidence continues to be examined. Until the final conclusions of the research are reached, you may wish to minimize your exposure to electromagnetic fields when welding or cutting.

To reduce magnetic fields in the workplace, use the following procedures:

1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep cutting power source and cables as far away from operator as practical.
5. Connect work clamp to workpiece as close to the cut as possible.

About Pacemakers:

Pacemaker wearers consult your doctor first. If cleared by your doctor, then following the above procedures is recommended.

SECTION 2 – CONSIGNES DE SÉCURITÉ – LIRE AVANT UTILISATION

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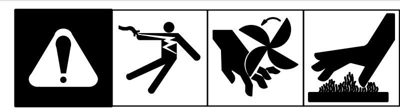
2-1. Signification des symboles



Signifie Mise en garde ! Soyez vigilant ! Cette procédure présente des risques de danger ! Ceux-ci sont identifiés par des symboles adjacents aux directives.

▲ **Identifie un message de sécurité particulier.**

☞ *Signifie NOTA ; n'est pas relatif à la sécurité.*



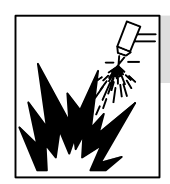
Ce groupe de symboles signifie Mise en garde ! Soyez vigilant ! Il y a des risques de danger reliés aux CHOCS ÉLECTRIQUES, aux PIÈCES EN MOUVEMENT et aux PIÈCES CHAUDES. Reportez-vous aux symboles et aux directives ci-dessous afin de connaître les mesures à prendre pour éviter tout danger.

2-2. Dangers liés au coupage à l'arc au plasma

▲ **Les symboles présentés ci-après sont utilisés tout au long du présent manuel pour attirer votre attention et identifier les risques de danger. Lorsque vous voyez un symbole, soyez vigilant et suivez les directives mentionnées afin d'éviter tout danger. Les consignes de sécurité présentées ci-après ne font que résumer l'information contenue dans les normes de sécurité énumérées à la section 2-4. Veuillez lire et respecter toutes ces normes de sécurité.**

▲ **L'installation, l'utilisation, l'entretien et les réparations ne doivent être confiés qu'à des personnes qualifiées.**

▲ **Au cours de l'utilisation, tenir toute personne à l'écart et plus particulièrement les enfants.**



LE COUPAGE présente un risque de feu ou d'explosion.

Des particules de métal chaud et des étincelles peuvent jaillir de la pièce au moment du coupage. Les étincelles et le métal chaud, la pièce à couper chauffée et l'équipement chaud peuvcnt causer un feu ou des brûlures. Avant de commencer à travailler, assurez-vous que l'endroit est sécuritaire.

- Protégez−vous, ainsi que toute autre personne travaillant sur les lieux, contre les étincelles et le métal chaud.
- Ne coupez pas dans un endroit où des étincelles pourraient atteindre des matières inflammables.
- Déplacez toute matière inflammable se trouvant à l'intérieur d'un périmètre de 10,7 m (35 pi) de la pièce à couper. Si cela est impossible, vous devez les couvrir avec des housses approuvées et bien ajustées.
- Assurez−vous qu'aucune étincelle ni particule de métal ne peut se glisser dans de petites fissures ou tomber dans d'autres pièces.
- Afin d'éliminer tout risque de feu, soyez vigilant et gardez toujours un extincteur à la portée de la main.
- Si vous coupez sur un plafond, un plancher ou une cloison, soyez conscient que cela peut entraîner un feu de l'autre côté.
- Ne coupez pas sur un contenant fermé tel qu'un réservoir ou un bidon.
- Fixez le câble de masse sur la pièce à couper, le plus près possible de la zone à couper afin de prévenir que le courant de coupage ne prenne une trajectoire inconnue ou longue et ne cause ainsi une décharge électrique ou un feu.
- Ne coupez jamais des contenants qui peuvent contenir des matières inflammables. Vous devez en premier lieu les vider et les nettoyer convenablement.
- Ne coupez pas dans un endroit où l'atmosphère risque de contenir de la poussière ou des vapeurs explosives.
- Ne coupez pas de bouteilles, de tuyaux ou de contenants pressurisés.
- Ne coupez pas de contenants qui ont déjà reçu des combustibles.
- Portez des vêtements de protection exempts d'huile tels que des gants en cuir, une veste résistante, des pantalons sans revers, des bottes et un casque.
- Ne placez pas le poste sur une surface combustible ou au−dessus de celle−ci.
- Avant le coupage, retirez tout combustible de vos poches, par exemple un briquet au butane ou des allumettes.



UNE DÉCHARGE ÉLECTRIQUE peut entraîner la mort.

Le fait de toucher à une pièce électrique sous tension peut donner une décharge fatale ou entraîner des brûlures graves. Le chalumeau et le circuit de masse sont automatiquement actifs lorsque le poste est sous tension. L'alimentation d'entrée et les circuits internes de l'appareil le sont également. Le coupage au plasma d'arc exige des tensions plus élevées que le soudage pour amorcer et maintenir l'arc (souvent de 200 à 400 V CC), c'est pourquoi on fait appel à des chalumeaux conçus avec un système de verrouillage sécuritaire qui met l'appareil hors tension lorsque la capsule anti−feu est desserrée ou si le tube touche l'électrode à l'intérieur de la buse. Un poste incorrectement installé ou inadéquatement mis à la terre constitue un danger.

- Ne touchez pas aux pièces électriques sous tension.
- Portez des gants isolants et des vêtements de protection secs et sans trous.
- Isolez−vous de la pièce à couper et du sol en utilisant des housses ou des tapis assez grands afin d'éviter tout contact physique avec la pièce à couper ou le sol.
- Ne touchez pas aux pièces du chalumeau si vous êtes en contact avec la pièce à couper ou le sol.
- Mettez l'appareil hors tension avant d'effectuer la vérification, le nettoyage ou le changement d'une pièce du chalumeau.
- Coupez l'alimentation d'entrée avant d'installer l'appareil ou d'effectuer l'entretien. Verrouillez ou étiquetez la sortie d'alimentation selon la norme OSHA 29 CFR 1910.147 (reportez−vous aux Principales normes de sécurité).
- Installez le poste correctement et mettez-le à la terre convenablement selon les consignes du manuel de l'opérateur et les normes nationales, provinciales et locales.
- Assurez−vous que le fil de terre du cordon d'alimentation est correctement relié à la borne de terre dans la boîte de coupure ou que la fiche du cordon est branchée à une prise correctement mise à la terre − vous devez toujours vérifier la mise à la terre.
- Avant d'effectuer les connexions d'alimentation, vous devez relier le bon fil de terre.
- Vérifiez fréquemment le cordon d'alimentation afin de vous assurer qu'il n'est pas altéré ou à nu, remplacez−le immédiatement s'il l'est. Un fil à nu peut entraîner la mort.
- L'équipement doit être hors tension lorsqu'il n'est pas utilisé.
- Vérifiez et remplacez les cosses du câble du chalumeau si elles sont usées ou altérées.
- Le câble du chalumeau ne doit pas s'enrouler autour de votre corps.
- Si les normes le stipulent, la pièce à couper doit être mise à la terre.
- Utilisez uniquement de l'équipement en bonne condition. Réparez ou remplacez immédiatement toute pièce altérée.
- Portez un harnais de sécurité si vous devez travailler au−dessus du sol.
- Assurez−vous que tous les panneaux et couvercles sont correctement en place.
- N'essayez pas d'aller à l'encontre des systèmes de verrrouillage de sécurité ou de les contourner.
- Utilisez uniquement le ou les chalumeaux recommandés dans le manuel de l'opérateur.
- N'approchez pas le tube du chalumeau et l'arc pilote lorsque la gâchette est enfoncée.
- Le câble de masse doit être pincé correctement sur la pièce à couper, métal contre métal (et non de telle sorte qu'il puisse se détacher), ou sur la table de travail le plus près possible de la ligne de coupage.

- Isoler la pince de masse quand pas mis à la pièce pour éviter le contact avec tout objet métallique.

Il y a DU COURANT CONTINU IMPORTANT dans les convertisseurs après la suppression de l'alimentation électrique.

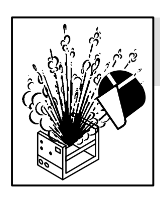
- Arrêter les convertisseurs, débrancher le courant électrique, et décharger les condensateurs d'alimentation selon les instructions indiquées dans la partie entretien avant de toucher les pièces.



DÉCHARGES ÉLECTRIQUES potentiellement mortelles.

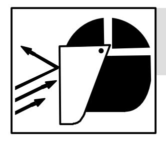
Les pièces internes des sources d'alimentation de l'inverseur ont DES CHARGES C.C. SIGNIFICATIVES même APRÈS coupure du courant d'alimentation.

- Mettre l'unité hors tension, mesurer la tension des condensateurs d'entrée et s'assurer qu'elle est pratiquement nulle avant de toucher à l'une quelconque des pièces. Mesurer cette tension conformément aux directives énoncées à la section Entretien du manuel de l'utilisateur ou du manuel technique avant de toucher à l'une quelconque des pièces.



Risque de blessure en cas D'EXPLOSION DES PIÈCES.

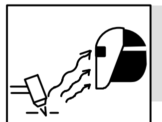
- Mise sous tension, toute pièce défectueuse des sources d'alimentation de l'inverseur peut exploser ou faire exploser d'autres pièces. Pour entretenir les inverseurs, toujours porter un masque protecteur et un vêtement à manches longues.



LES ÉTINCELLES VOLANTES risquent de provoquer des blessures.

Le coupage plasma produit des étincelles et projections de métal à très haute température. Lorsque la pièce refroidit, du laitier peut se former.

- Portez une visière ou des lunettes de sécurité avec des écrans latéraux approuvées.
- Portez des vêtements de protection adéquats afin de protéger votre peau.
- Ayez recours à des protège−tympans ou à un serre−tête ignifuges afin d'éviter que les étincelles n'entrent dans vos oreilles.



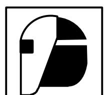
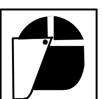
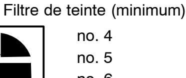
LES RAYONS D'ARC peuvent entraîner des brûlures aux yeux et à la peau.

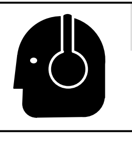
Les rayons d'arc provenant du procédé de coupage produisent des rayons visibles et invisibles intenses (ultraviolets et infrarouges) qui peuvent entraîner des brûlures aux yeux et à la peau.

- Lorsque vous coupez ou regardez quelqu'un couper, portez un masque ou un écran facial avec le filtre approprié. La norme ANSI Z49.1 (reportez−vous aux Principales normes de sécurité) suggère d'utiliser un filtre de teinte n○ 9 (n○ 8 étant le minimum) pour tout travail de coupage faisant appel à un courant de moins de 300 A. On mentionne également dans la norme Z49.1 qu'un filtre plus faible peut être utilisé lorsque l'arc est caché par la pièce à couper. Comme cela est habituellement le cas pour les travaux de coupage à faible courant, les teintes énumérées au tableau 1 sont fournies à titre d'information pour l'opérateur.
- Porter des lunettes de sécurité à coques latérales sous votre casque ou écran facial.
- Ayez recours à des écrans protecteurs ou à des rideaux pour protéger les autres contre les rayonnements et les éblouissements; prévenez toute personne sur les lieux de ne pas regarder l'arc.
- Portez des vêtements confectionnés avec des matières résistantes et ignifuges (cuir et laine) et des bottes de protection.

Tableau 1. Protection des yeux pour le coupage au plasma d'arc

Intensité de courant en ampères	Filtre de teinte (minimum)
Moins de 20	no. 4
20 − 40	no. 5
40 − 60	no. 6
60 − 80	no. 8



LE BRUIT peut endommager l'ouïe.

Certaines applications de coupage produisent un bruit constant, ce qui peut endommager l'ouïe si le niveau sonore dépasse les limites permises par l'OSHA (reportez−vous aux Principales normes de sécurité).

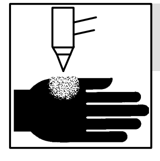
- Utilisez des protège−tympans ou un serre−tête antibruit si le niveau sonore est élevé.
- Prévenez toute personne sur les lieux du danger relié au bruit.



LES FUMÉES ET LES GAZ peuvent être dangereux.

Le coupage produit des vapeurs et des gaz. Respirer ces vapeurs et ces gaz peut être dangereux pour la santé.

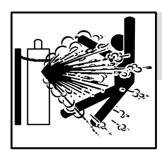
- Ne mettez pas votre tête au−dessus des vapeurs. Ne respirez pas ces vapeurs.
- Si vous êtes à l'intérieur au moment du coupage, ventilez la pièce ou ayez recours à une ventilation aspirante installée près de l'arc pour évacuer les vapeurs et les gaz.
- Si la ventilation est médiocre, utilisez un respirateur anti−vapeurs approuvé.
- Veuillez lire le Material Safety Data Sheets (MSDS) et les instructions du fabricant pour obtenir plus de renseignements sur les métaux à couper, les enrobages et les nettoyants.
- Travaillez dans un espace restreint uniquement s'il est bien ventilé ou si vous portez un respirateur anti−vapeurs. Les vapeurs causées par le coupage et l'épuisement de l'oxygène peuvent altérer la qualité de l'air et entraîner des blessures ou la mort. Assurez−vous que l'air ambiant est sain pour la santé.
- Ne coupez pas dans un endroit près d'opérations de décapage, de nettoyage ou de vaporisation. La chaleur et les rayons d'arc peuvent réagir avec les vapeurs et former des gaz hautement toxiques et irritants.
- Ne coupez pas des métaux enrobés tels que des métaux galvanisés, contenant du plomb ou de l'acier plaqué au cadmium, à moins que l'enrobage ne soit ôté de la surface du métal à couper, que l'endroit où vous travaillez ne soit bien ventilé, ou, si nécessaire, que vous ne portiez un respirateur anti−vapeurs. Les enrobages ou tous métaux qui contiennent ces éléments peuvent créer des vapeurs toxiques s'ils sont coupés.
- Ne coupez pas de contenants qui renferment ou ont renfermés des matières toxiques ou réactives − vous devez en premier lieu les vider et les nettoyer convenablement.



LE PLASMA D'ARC peut entraîner des blessures.

La chaleur dégagée par le plasma d'arc peut entraîner de sérieuses brûlures. La force de l'arc est un facteur qui s'ajoute au danger de brûlures. La chaleur intense et la puissance de l'arc peuvent rapidement passer au travers de gants et de tissus.

- N'approchez pas le tube du chalumeau.
- Ne saisissez pas la pièce à couper près de la ligne de coupage.
- L'arc pilote peut causer des brûlures − n'approchez pas le tube du chalumeau lorsque vous avez appuyé sur le gâchette.
- Portez des vêtements de protection adéquats qui recouvrent tout votre corps.
- Ne pointez pas le chalumeau en direction de votre corps ni de la pièce à couper lorsque vous appuyez sur la gâchette − l'arc pilote s'allume automatiquement.
- Mettez l'alimentation hors tension et débranchez le cordon d'alimentation avant de démonter le chalumeau ou de changer une pièce du chalumeau.
- Utilisez uniquement le ou les chalumeaux recommandés dans le manuel de l'opérateur.



LES BOUTEILLES peuvent exploser si elles sont endommagées.

Les bouteilles de gaz contiennent du gaz sous haute pression. Si une bouteille est endommagée, elle peut exploser. Puisque les bouteilles de gaz font habituellement partie d'un processus de travail des métaux, assurez−vous de les manipuler correctement.

- Protégez les bouteilles de gaz comprimé contre la chaleur excessive, les chocs mécaniques, le laitier, la flamme, les étincelles et l'arc.
- Installez et attachez les bouteilles dans la position verticale à l'aide d'une chaîne, sur un support stationnaire ou un châssis porte−bouteille afin de prévenir qu'elles ne tombent ou ne basculent.
- Les bouteilles ne doivent pas être près de la zone de coupage ni de tout autre circuit électrique.
- Un contact électrique ne doit jamais se produire entre un chalumeau de plasma d'arc et une bouteille.
- Ne coupez jamais sur une bouteille pressurisée − une explosion en résulterait.
- Utilisez uniquement des bouteilles de gaz, des détendeurs, des boyaux et des raccords conçus pour l'application déterminée. Gardez−les, ainsi que toute autre pièce associée, en bonne condition.
- Détournez votre visage du détendeur−régulateur lorsque vous ouvrez la soupape de la bouteille.
- Le couvercle du détendeur doit toujours être en place, sauf lorsque vous utilisez la bouteille ou qu'elle est reliée pour usage ultérieur.
- Lisez et suivez les instructions sur les bouteilles de gaz comprimé, l'équipement connexe et le dépliant P−1 de la CGA mentionné dans les Principales normes de sécurité.

2-3. Dangers supplémentaires en relation avec l'installation, le fonctionnement et la maintenance



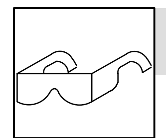
DES PIECES CHAUDES peuvent provoquer des brûlures graves.

- Ne pas toucher des parties chaudes à mains nues.
- Laisser refroidir avant d'intervenir sur la torche.



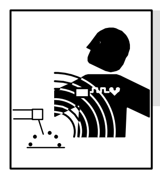
DES ORGANES MOBILES peuvent provoquer des blessures.

- S'abstenir de toucher des organes mobiles tels que des ventilateurs.
- Maintenir fermés et verrouillés les portes, panneaux, recouvrements et dispositifs de protection.



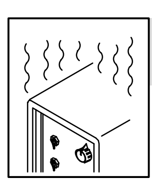
DES PARTICULES VOLANTES peuvent blesser les yeux.

- Porter des lunettes de sécurité avec protections latérales ou frontales.



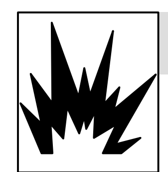
LES CHAMPS MAGNÉTIQUES peuvent affecter les stimulateurs cardiaques.

- Porteurs de stimulateur cardiaque, restez à distance.
- Les porteurs sont priés de consulter leur médecin avant d'approcher les opérations de coupage plasma.



L'EMPLOI EXCESSIF peut SURCHAUFFER L'ÉQUIPEMENT.

- Prévoir une période de refroidissement; respecter le cycle opératoire nominal.
- Réduire l'ampérage (épaisseur) avant de continuer à couper ou réduire le facteur de marche.



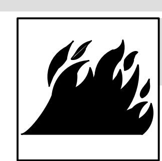
Danger D'EXPLOSION D'HYDROGÈNE.

- Lors du coupage d'aluminium partiellement ou totalement immergé dans l'eau, de l'hydrogène libre peut s'accumuler sous la pièce.
- Consultez votre ingénieur de coupage et les instructions de la table de coupage.



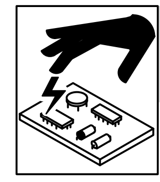
LA CHUTE DE L'APPAREIL peut blesser.

- Utiliser l'anneau de levage uniquement pour soulever l'appareil, NON PAS les chariot, les bouteilles de gaz ou tout autre accessoire.
- Utiliser un engin d'une capacité appropriée pour soulever l'appareil.
- En utilisant des fourches de levage pour déplacer l'unité, s'assurer que les fourches sont suffisamment longues pour dépasser du côté opposé de l'appareil.



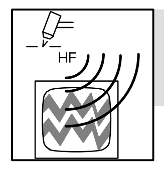
Risque D'INCENDIE OU D'EXPLOSION.

- Ne pas placer l'appareil sur, au-dessus ou à proximité de surfaces infllammables.
- Ne pas installer l'appareil à proximité de produits inflammables
- Ne pas surcharger l'installation électrique − s'assurer que l'alimentation est correctement dimensionné et protégé avant de mettre l'appareil en service.



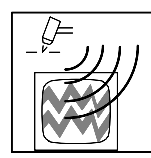
LES CHARGES ÉLECTROSTATIQUES peuvent endommager les circuits imprimés.

- Etablir la connexion avec la barrette de terre avant de manipuler des cartes ou des pièces.
- Utiliser des pochettes et des boîtes antistatiques pour stocker, déplacer ou expédier des cartes PC.



LE RAYONNEMENT HAUTE FRÉQUENCE (H.F.) risque de provoquer des interférences.

- Le Rayonnement haute frequence (H.F.) peut provoquer des interférences avec les équipements de radio−navigation et de communication, les services de sécurité et les ordinateurs.
- Demander seulement à des personnes qualifiées familiarisées avec des équipements électroniques de faire fonctionner l'installation.
- L'utilisateur est tenu de faire corriger rapidement par un électricien qualifié les interférences résultant de l'installation.
- Si le FCC signale des interférences, arrêter immédiatement l'appareil.
- Effectuer régulièrement le contrôle et l'entretien de l'installation.
- Maintenir soigneusement fermés les portes et les panneaux des sources de haute fréquence, maintenir les éclateurs à une distance correcte et utiliser une terre et un blindage pour réduire les interférences éventuelles.



LE COUPAGE Ã L'ARC peut causer des interférence.

- L'énergie électromagnétique peut gêner le fonctionnement d'appareils électroniques comme des ordinateurs et des robots.
- Pour réduire la possibilité d'interférence, maintenir les câbles aussi courts que possible, les grouper, et les poser aussi bas que possible (ex. par terre).
- Veiller à couper à une distance de 100 mètres de tout équipement électronique sensible.
- S'assurer que la source de coupage est correctement branchée et mise à la terre.
- Si l'interférence persiste, l'utilisateur doit prendre des mesures supplémentaires comme écarter la machine, utiliser des câbles blindés de des filtres, ou boucler la zone de travail.

2-4. Principales normes de sécurité

Safety in Welding and Cutting, norme ANSI Z49.1, de l'American Welding Society, 550 N.W. Lejeune Rd, Miami FL 33126

Safety and Health Sandards, OSHA 29 CFR 1910, du Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Recommended Safe Practice for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, norme AWS F4.1, de l'American Welding Society, 550 N.W. Lejeune Rd, Miami FL 33126

National Electrical Code, NFPA Standard 70, de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, de la Compressed Gas Association, 1235 Jefferson Davis Highway, Suite 501, Arlington, VA 22202.

Règles de sécurité en soudage, coupage et procédés connexes, norme CSA W117.2, de l'Association canadienne de normalisation, vente de normes, 178 Rexdale Boulevard, Rexdale (Ontario) Canada M9W 1R3.

Safe Practices For Occupation And Educational Eye And Face Protection, norme ANSI Z87.1, de l'American National Standards Institute, 1430 Broadway, New York, NY 10018.

Cutting and Welding Processes, norme NFPA 51B, de la National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

2-5. Information sur les champs électromagnétiques

Données sur le soudage électrique et sur les effets, pour l'organisme, des champs magnétiques basse fréquence

Le courant de soudage ou de coupage passant dans les câbles de puissance crée des causera des champs électromagnétiques. Il y a eu et il y a encore un certain souci à propos de tels champs. Cependant, après avoir examiné plus de 500 études qui ont été faites pendant une période de recherche de 17 ans, un comité spécial ruban bleu du National Research Council a conclu: “L'accumulation de preuves, suivant le jugement du comité, n'a pas démontré que l'exposition aux champs magnétiques et champs électriques à haute fréquence représente un risque à la santé humaine”. Toutefois, des études sont toujours en cours et les preuves continuent à être examinées. En attendant que les conclusions finales de la recherche soient établies, il vous serait souhaitable de réduire votre exposition aux champs électromagnétiques pendant le soudage ou le coupage.

Afin de réduire les champs électromagnétiques dans l'environnement de travail, respecter les consignes suivantes :

1 Garder les câbles ensembles en les torsadant ou en les attachant avec du ruban adhésif.

2 Mettre tous les câbles du côté opposé de l'opérateur.

3 Ne pas courber pas et ne pas entourer pas les câbles autour de vous.

4 Garder le poste de soudage et les câbles le plus loin possible de vous.

5 Relier la pince de masse le plus près possible de la zone de soudure.

Consignes relatives aux stimulateurs cardiaques :

Les consignes mentionnées précédemment font partie de celles destinées aux personnes ayant recours à un stimulateur cardiaque. Veuillez consulter votre médecin pour obtenir plus de détails.

SECTION 3 – DEFINITIONS

3-1. Warning Label Definitions



Warning! Watch Out! There are possible hazards as shown by the symbols.

1 Cutting sparks can cause explosion or fire.

1.1 Keep flammables away from cutting. Do not cut near flammables.

1.2 Cutting sparks can cause fires. Have a fire extinguisher nearby, and have a watchperson ready to use it.

1.3 Do not cut on drums or any closed containers.

2 The plasma arc can cause injury and burns.

2.1 Turn off power before disassembling torch.

2.2 Do not grip material near cutting path.

2.3 Wear complete body protection.

3 Electric shock from torch or wiring can kill.

3.1 Wear dry insulating gloves. Do not wear wet or damaged gloves.

3.2 Protect yourself from electric shock by insulating yourself from work and ground.

3.3 Disconnect input plug or power before working on machine.

4 Breathing cutting fumes can be hazardous to your health.

4.1 Keep your head out of the fumes.

4.2 Use forced ventilation or local exhaust to remove the fumes.

4.3 Use ventilating fan to remove fumes.

5 Arc rays can burn eyes and injure skin.

5.1 Wear hat and safety glasses. Use ear protection and button shirt collar. Use welding helmet with correct shade of filter. Wear complete body protection.

6 Become trained and read the instructions before working on the machine or cutting.

7 Do not remove or paint over (cover) the label.

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Warning! Watch Out! There are possible hazards as shown by the symbols.

Electric shock from wiring can kill.

Disconnect input plug or power before working on machine.

Read the Owner's Manual before working on this machine.

1 Consult rating label for input power requirements, and check power available at the job site – they must match.

2 Read Owner's Manual and inside labels for connection points and procedures.

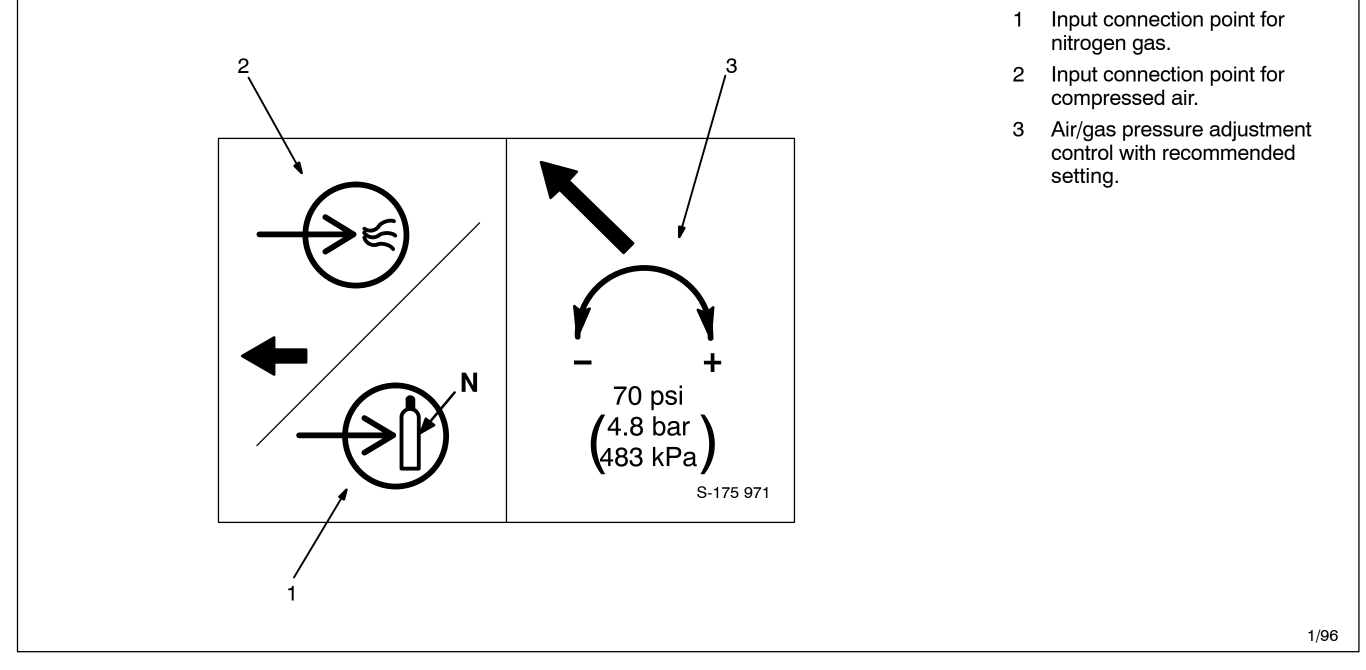
3 Move jumper links as shown on inside label to match voltage at job site.

4 Having a loop of extra length, connect grounding conductor first.

5 Connect line input conductors as shown on inside label – double-check all connections, jumper link positions, and input voltage before applying power.

S-179 290

1/96



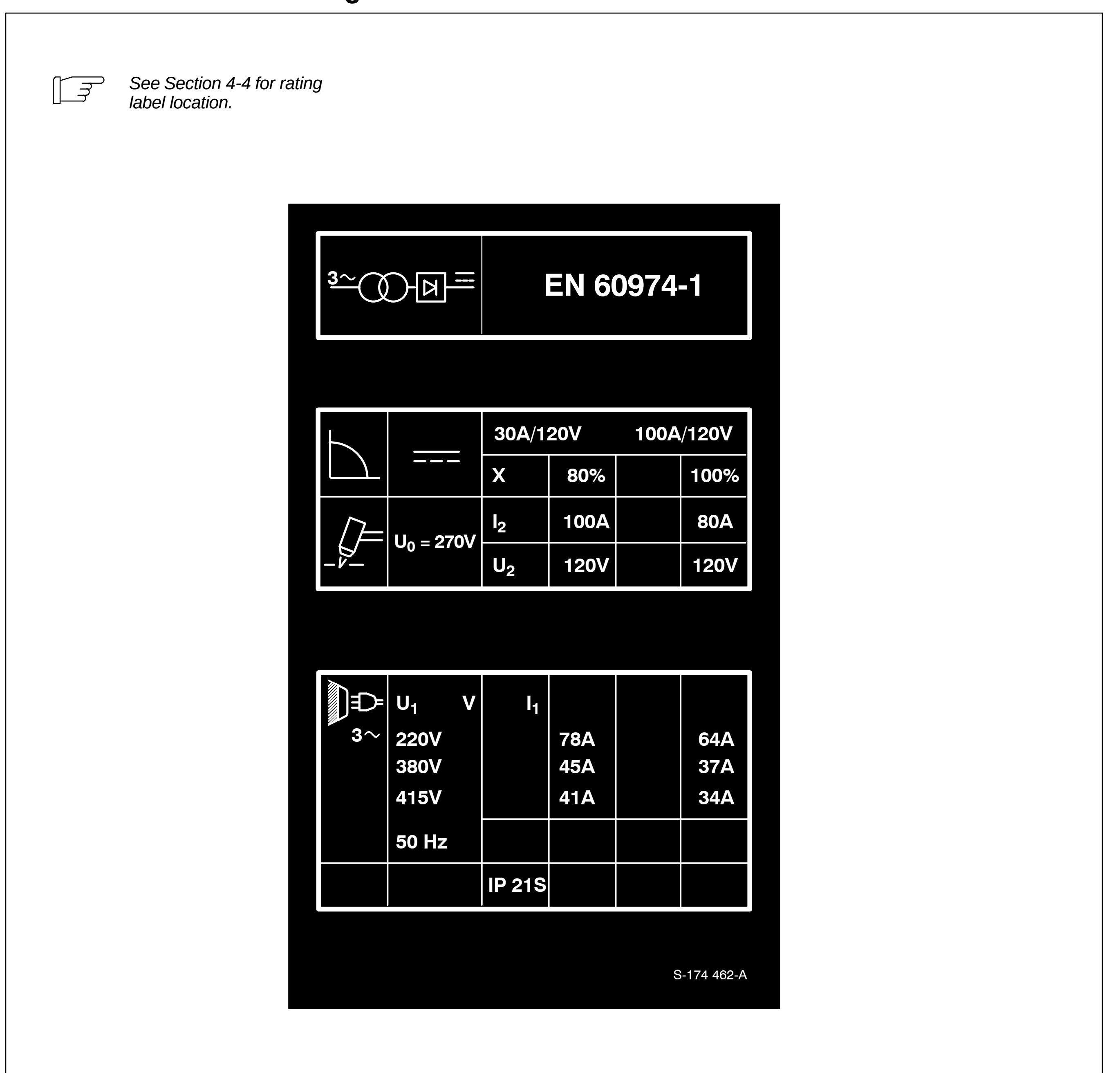
1 Input connection point for nitrogen gas.

2 Input connection point for compressed air.

3 Air/gas pressure adjustment control with recommended setting.

1/96

3-2. Manufacturer's Rating Label For CE Products



3-3. Symbols And Definitions

NOTE	*Some symbols are found only on CE products.*

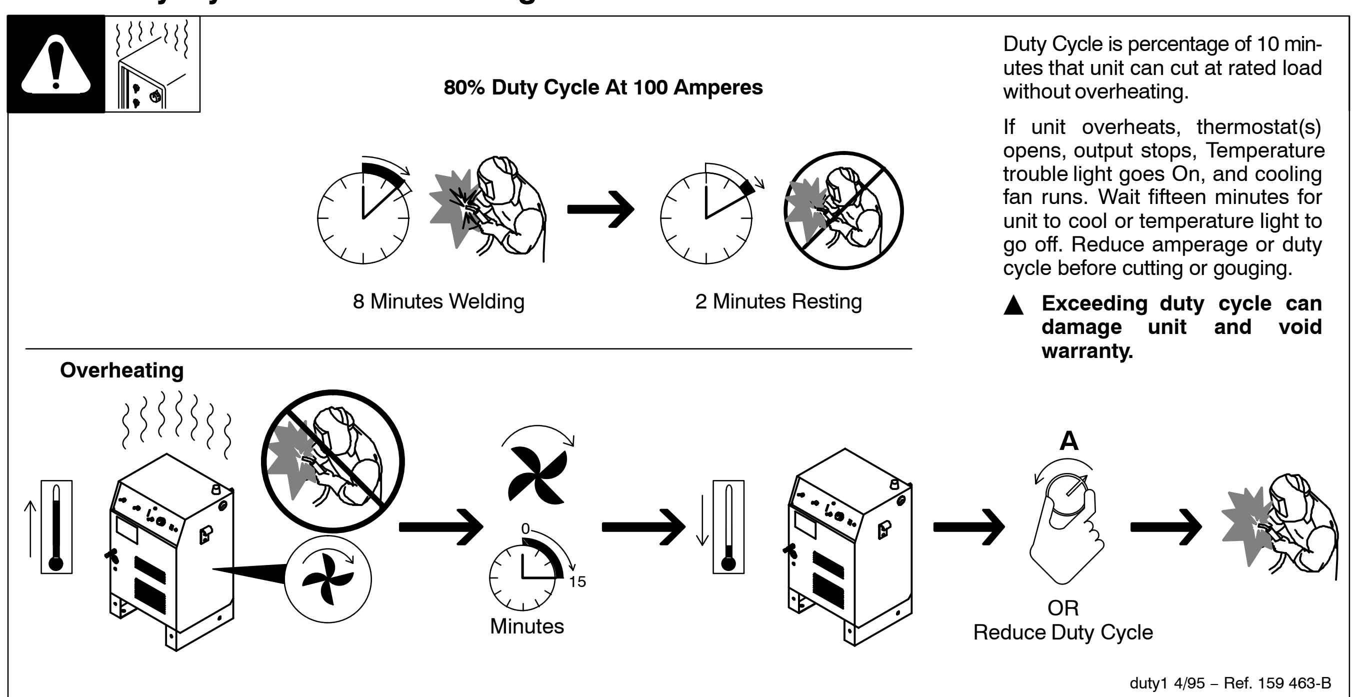
A	Amperes		Plasma Arc Cutting (PAC)		Trigger Hold On		Trigger Hold Off
V	Volts		Pilot/Pulse Starting		Continuous Pilot Arc		Pulse
	Output		Increase		No – Do Not Do This		Temperature
	Protective Earth (Ground)	3~	Three Phase	HF	High Frequency	V	Input
I	On	O	Off	%	Percent		Direct Current
U_0	Rated No Load Voltage (Average)	U_1	Primary Voltage	U_2	Conventional Load Voltage		Line Connection
I_1	Primary Current	I_2	Rated Welding Current	X	Duty Cycle	3~	Three Phase Transformer Rectifier
IP	Degree Of Protection		Loose Shield Cup	+ –	Torch-Tip-To Electrode Short	Hz	Hertz
– +	Air/Gas Pressure Adjustment		Work		Low Air Pressure Light	N	Nitrogen Gas Input Connection
– +	Adjust Air/Gas Pressure						

SECTION 4 – INSTALLATION

4-1. Specifications

Model/ Rated Output	Amperes Input at Rated Output, 50 or 60 Hz, Three-Phase							KVA	KW	Plasma Gas	Plasma Gas Flow/ Pressure	Max OCV	IP Rating
	200 V	220 V	230 V	380 V	415 V	460 V	575 V						
1250 / 100 Amperes At 120 Volts DC At 80% Duty Cycle	85 (3.4*)	77 (4.0*)	74 (2.9*)	45 (2.5*)	41 (1.5*)	37 (1.5*)	30 (1.0*)	30 (1.2*)	16 (0.5*)	Air Or Nitrogen Only	7 CFM (198 L/min) At 70 PSI (482 kPa)	270 Volts DC	21S
*While idling													

4-2. Duty Cycle And Overheating

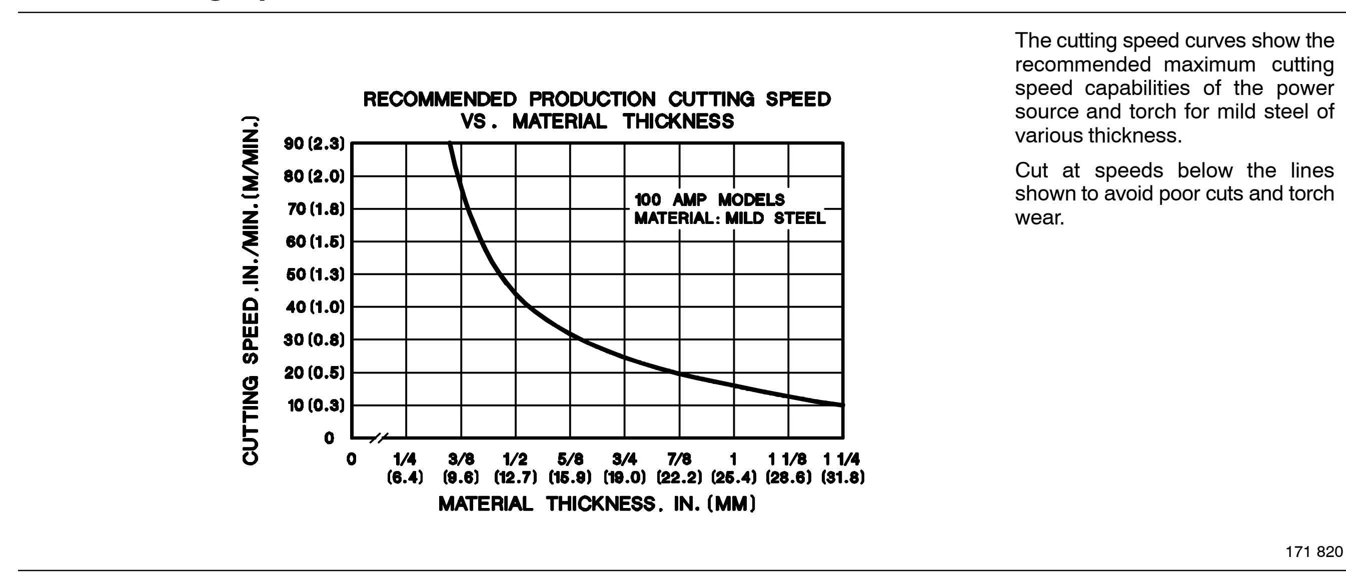


Duty Cycle is percentage of 10 minutes that unit can cut at rated load without overheating.

If unit overheats, thermostat(s) opens, output stops, Temperature trouble light goes On, and cooling fan runs. Wait fifteen minutes for unit to cool or temperature light to go off. Reduce amperage or duty cycle before cutting or gouging.

▲ **Exceeding duty cycle can damage unit and void warranty.**

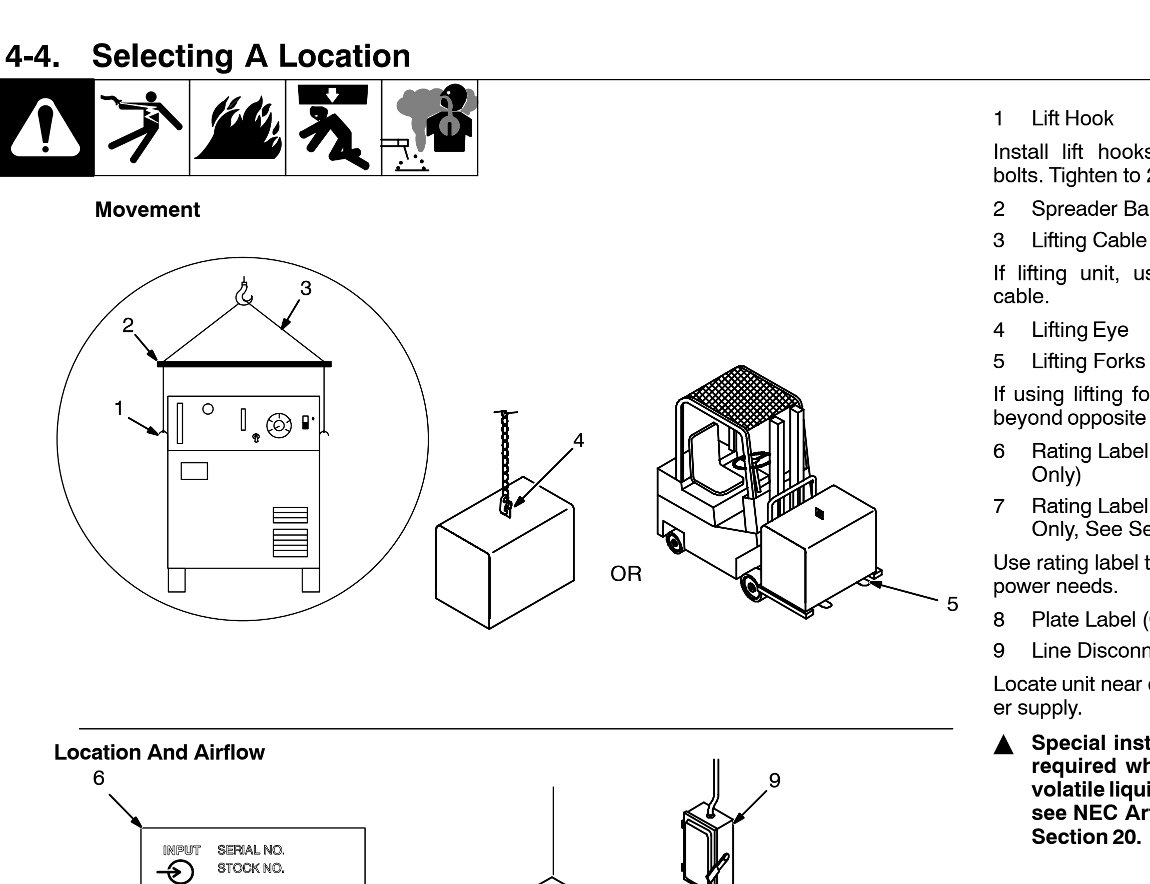
4-3. Cutting Speed



The cutting speed curves show the recommended maximum cutting speed capabilities of the power source and torch for mild steel of various thickness.

Cut at speeds below the lines shown to avoid poor cuts and torch wear.

4-4. Selecting A Location



1 Lift Hook

Install lift hooks using supplied bolts. Tighten to 25 ft/lb (34 N·m).

2 Spreader Bar (Not Supplied)

3 Lifting Cable (Not Supplied)

If lifting unit, use spreader and cable.

4 Lifting Eye

5 Lifting Forks

If using lifting forks, extend forks beyond opposite side of unit.

6 Rating Label (Non CE Models Only)

7 Rating Label (CE Models Only, See Section 3-2)

Use rating label to determine input power needs.

8 Plate Label (CE Models Only)

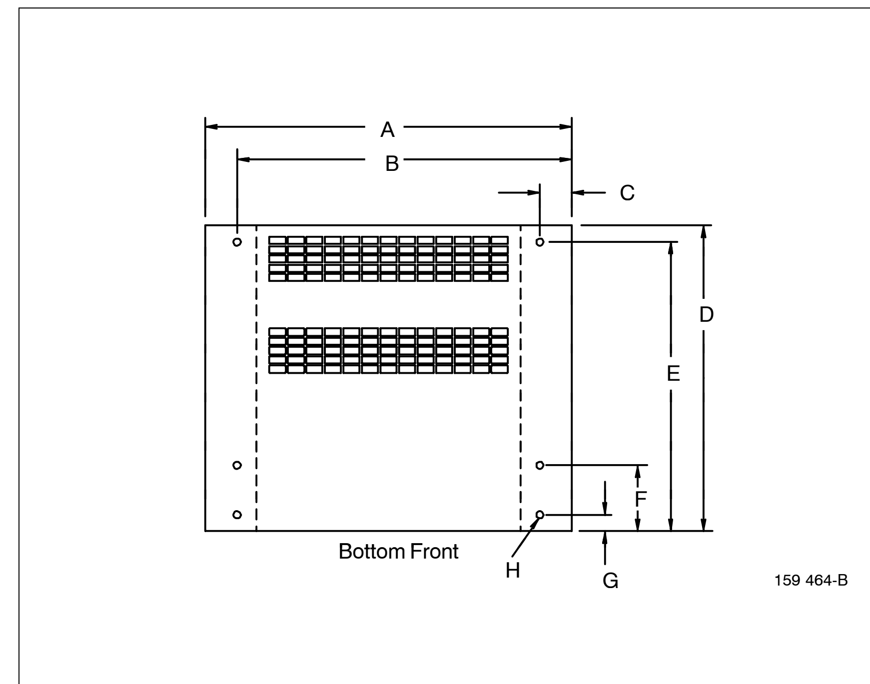
9 Line Disconnect Device

Locate unit near correct input power supply.

▲ **Special installation may be required where gasoline or volatile liquids are present – see NEC Article 511 or CEC Section 20.**

S-0439 / Ref. 800 402-B / 159 463-B

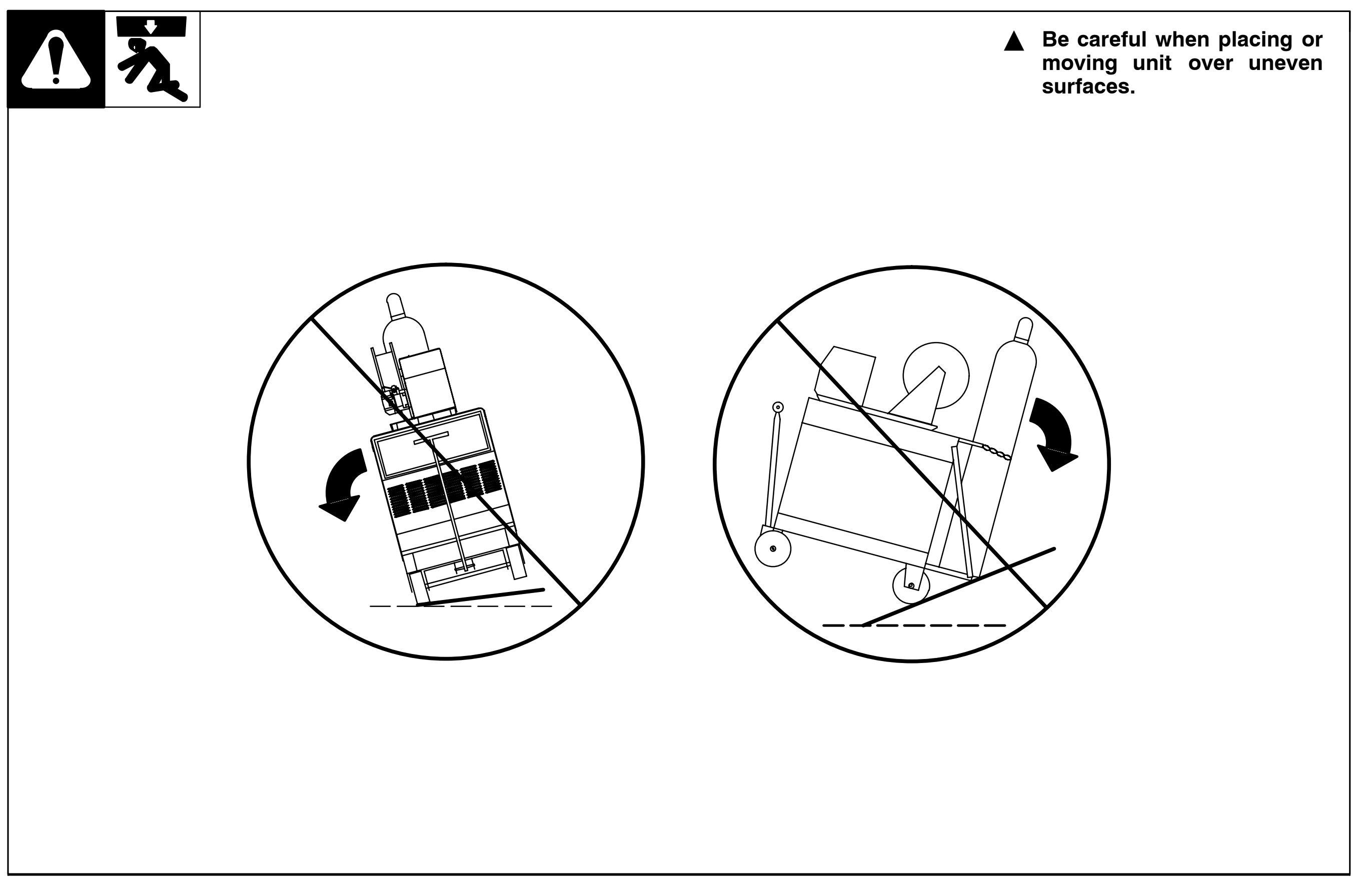
4-5. Dimensions And Weight



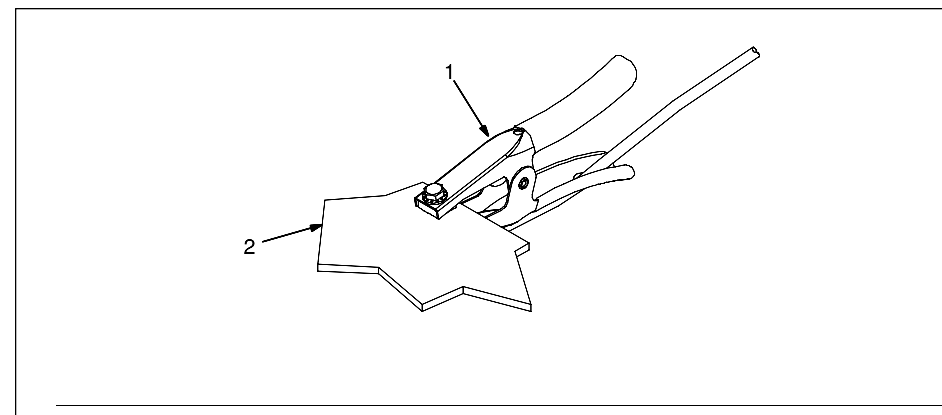
Dimensions	
Height	37-1/4 in (946 mm)
Width	22-3/4 in (578 mm)
Length	20 in (508 mm)
A	22-1/16 in (560 mm)
B	21-1/32 in (210 mm)
C	1-1/32 in (26 mm)
D	18-13/16 in (478 mm)
E	17-11/16 (449 mm)
F	5-5/8 (143 mm)
G	1-1/8 (29 mm)
H	7/16 in (11 mm) Dia
Weight	
405 lbs (184 kg)	

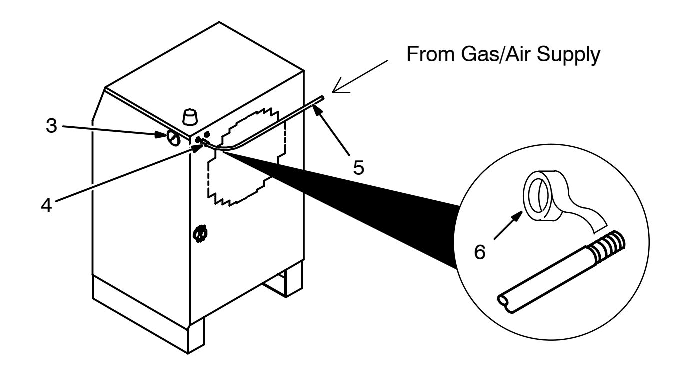
4-6. Tipping

▲ **Be careful when placing or moving unit over uneven surfaces.**

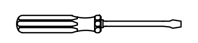


4-7. Connecting Work Clamp And Gas/Air Supply





Tools Needed:



5/8, 1-1/8 in

1 Work Clamp

2 Workpiece

Connect work clamp to a clean, paint-free location on workpiece, as close to cutting area as possible.

☞ *Use only clean, dry air or nitrogen gas. Do not use any other gas or combination of gases.*

3 Air Filter/Regulator

4 Gas/Air Inlet Opening

5 Hose

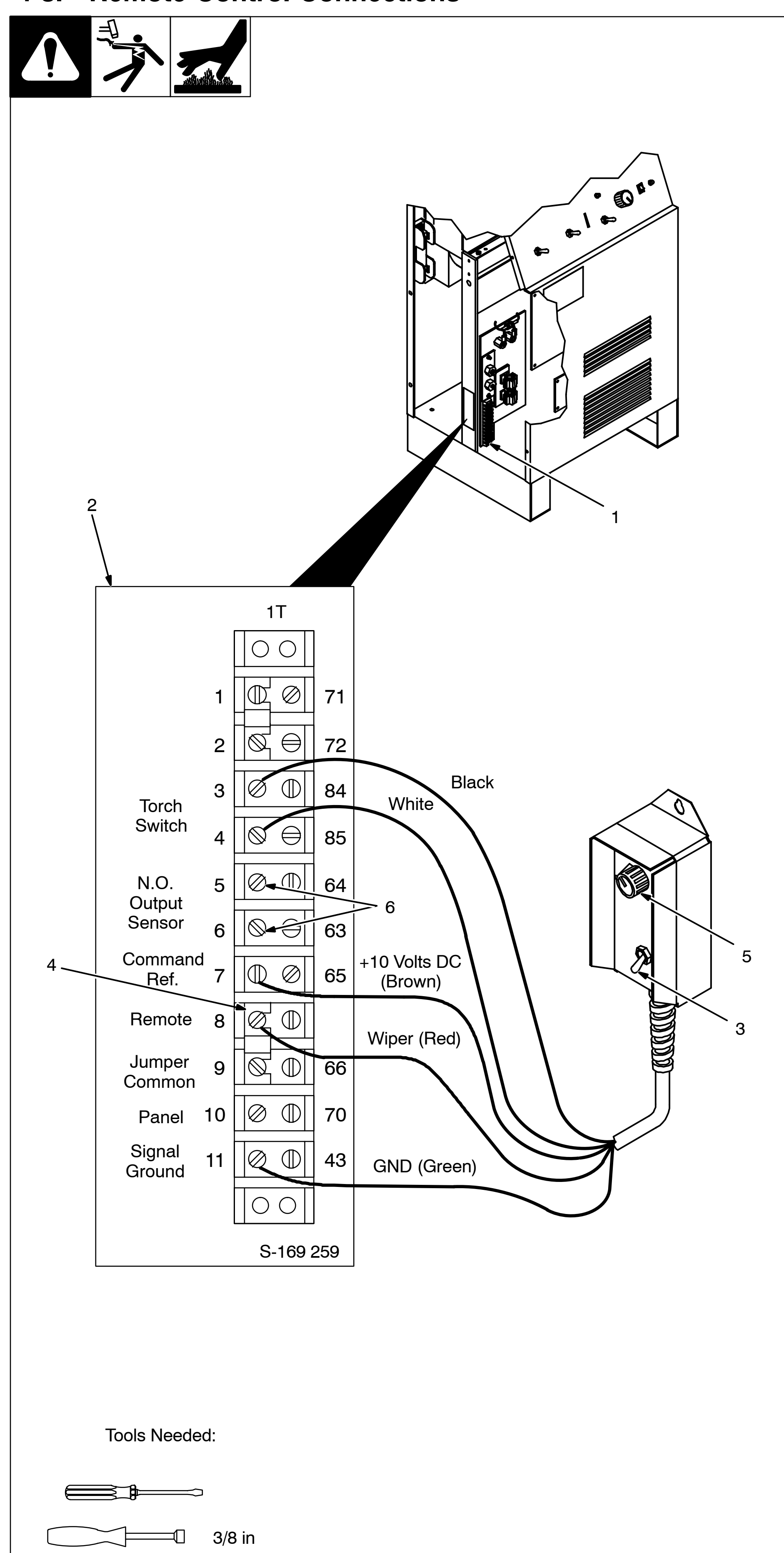
6 Teflon Tape

Obtain hose with 5/8-18 right-hand thread fitting. Wrap threads with teflon tape, and install fitting in opening.

Adjust gas/air pressure according to Section 5-1.

Ref. 803 640-A / 800 701 / S-0818

4-8. Remote Control Connections



▲ **Turn Off power before installing remote control.**

Remove left side panel.

1 Terminal Strip 1T

2 Connection Label

☞ *Lead colors shown match those of Remote Pendant Control supplied with machine-held torches.*

Route leads through hole below torch and work cable access holes. Refer to connection label and make connections as follows:

Torch On/Off Connections:

3 Remote On/Off Switch

Connect switch leads to terminals 3 and 4 as shown. Switch closure starts cutting arc.

Output Control Connections:

4 Jumper Link

For remote output control, remove jumper link between terminals 9 and 10, and reinstall between terminals 8 and 9 as shown. This disables front panel Output Control and enables remote output control.

5 Remote Output Control

Connect control leads to terminals 7, 8, and 11 as shown.

Output Sensor Connections:

6 Output Sensor Terminals

Terminals 5 and 6 connect to internal, normally-open contacts which close when cutting output is present. For example, use signal to start automatic fixture.

Reinstall side panel.

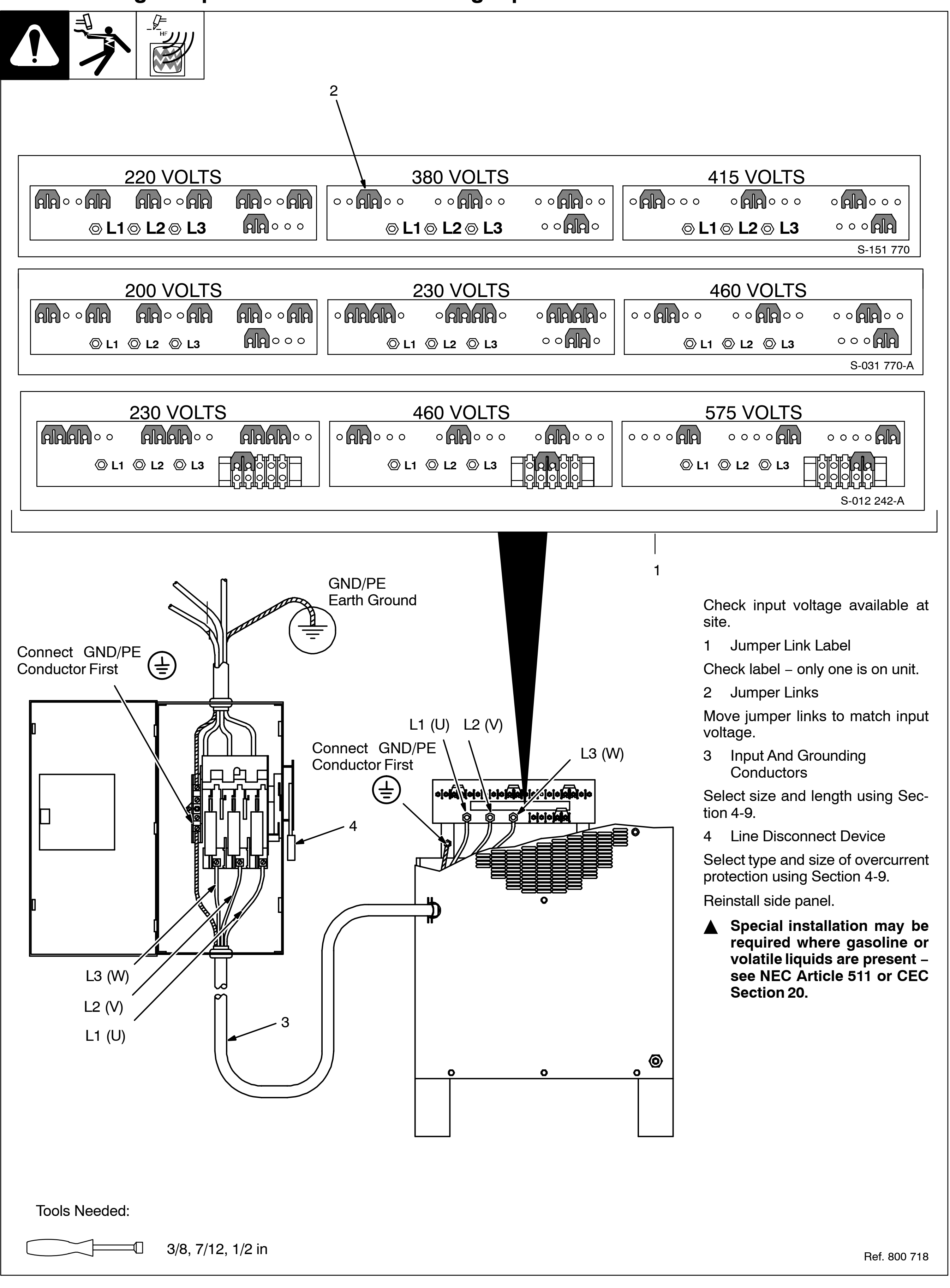
Ref. 159 466-C / Ref. 150 802-A

4-9. Electrical Service Guide

60 Hertz Models				
Input Voltage	200	230	460	575
Input Amperes At Rated Output	85	74	37	30
Max Recommended Standard Fuse Or Circuit Breaker Rating In Amperes	125	125	60	45
Min Input Conductor Size In AWG	4	4	8	10
Max Recommended Input Conductor Length In Feet (Meters)	160 (49)	212 (65)	389 (119)	413 (126)
Min Grounding Conductor Size In AWG	6	6	10	10
Reference: 1993 National Electrical Code (NEC)				S-0092-J

50 Hertz Models			
Input Voltage	220	380	415
Input Amperes At Rated Output	77	45	41
Max Recommended Standard Fuse Or Circuit Breaker Rating In Amperes	125	70	60
Min Input Conductor Size In AWG	4	8	8
Max Recommended Input Conductor Length In Feet (Meters)	190 (58)	260 (79)	310 (94)
Min Grounding Conductor Size In AWG	6	8	10
Reference: 1993 National Electrical Code (NEC)			S-0092-J

4-10. Placing Jumper Links And Connecting Input Power



Check input voltage available at site.

1 Jumper Link Label

Check label – only one is on unit.

2 Jumper Links

Move jumper links to match input voltage.

3 Input And Grounding Conductors

Select size and length using Section 4-9.

4 Line Disconnect Device

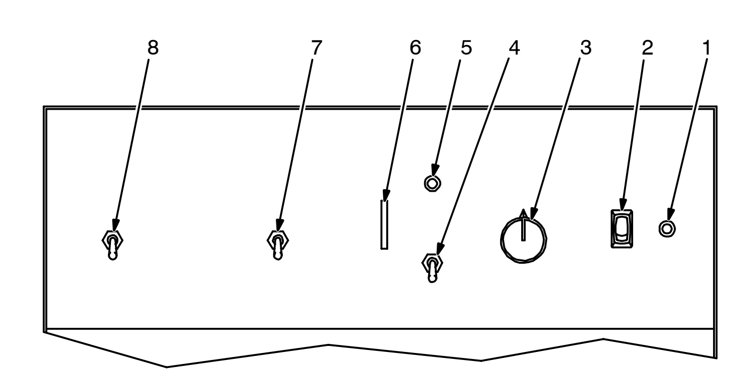
Select type and size of overcurrent protection using Section 4-9.

Reinstall side panel.

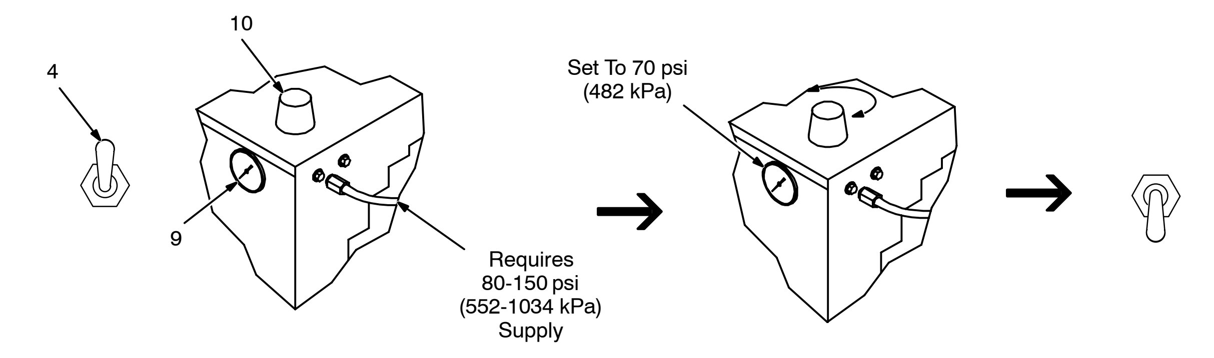
▲ **Special installation may be required where gasoline or volatile liquids are present – see NEC Article 511 or CEC Section 20.**

SECTION 5 – OPERATION

5-1. Controls



Setting Gas/Air Pressure



1 Pilot Light

2 Power Switch

3 Output Control

Use control to set cutting output.

For non-shielded cutting, use a 1/8 in (3 mm) standoff distance between torch tip and workpiece.

4 Set/Run Switch

Place switch up to safely adjust gas/air pressure. Only gas/air circuit is activated.

Place switch down to cut or gouge.

5 Ready Light

Use light to tell if unit is ready for operation.

Ready light comes on when Power switch is placed in On position, indicating that all safety shutdown systems are okay.

If Ready light does not come on, check Trouble Lights.

6 Trouble Lights (See Section 6-3)

7 Trigger Hold Switch

To cut without holding torch trigger, place switch up, and begin cutting by pressing and releasing torch trigger. To stop cutting, press and release trigger.

When set in down position, trigger must be held closed while cutting.

8 Pilot Arc Control Switch

Place switch down for pulsed pilot arc output. Use this position whenever possible to reduce wear on torch and consumables.

Place switch up for a continuous pilot arc. Use this position when cutting starts are critical or while cutting expanded metals.

Setting Gas/Air Pressure

9 Air Filter/Regulator

10 Pressure Adjustment Knob

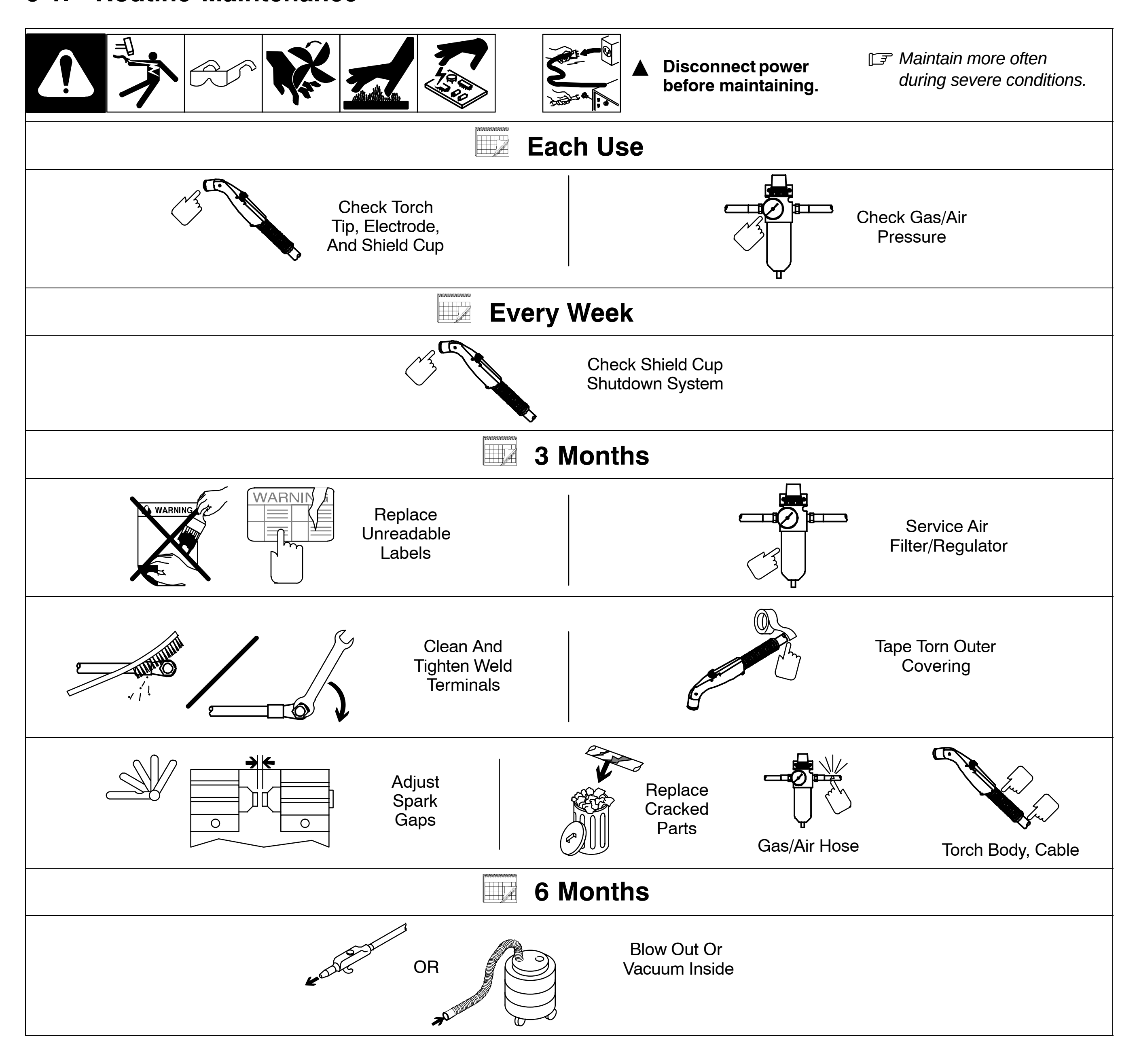
Place Set/Run switch up and turn on gas/air supply. Lift knob and turn to adjust pressure. Push knob down to lock in setting.

Place Set/Run switch down to begin cutting.

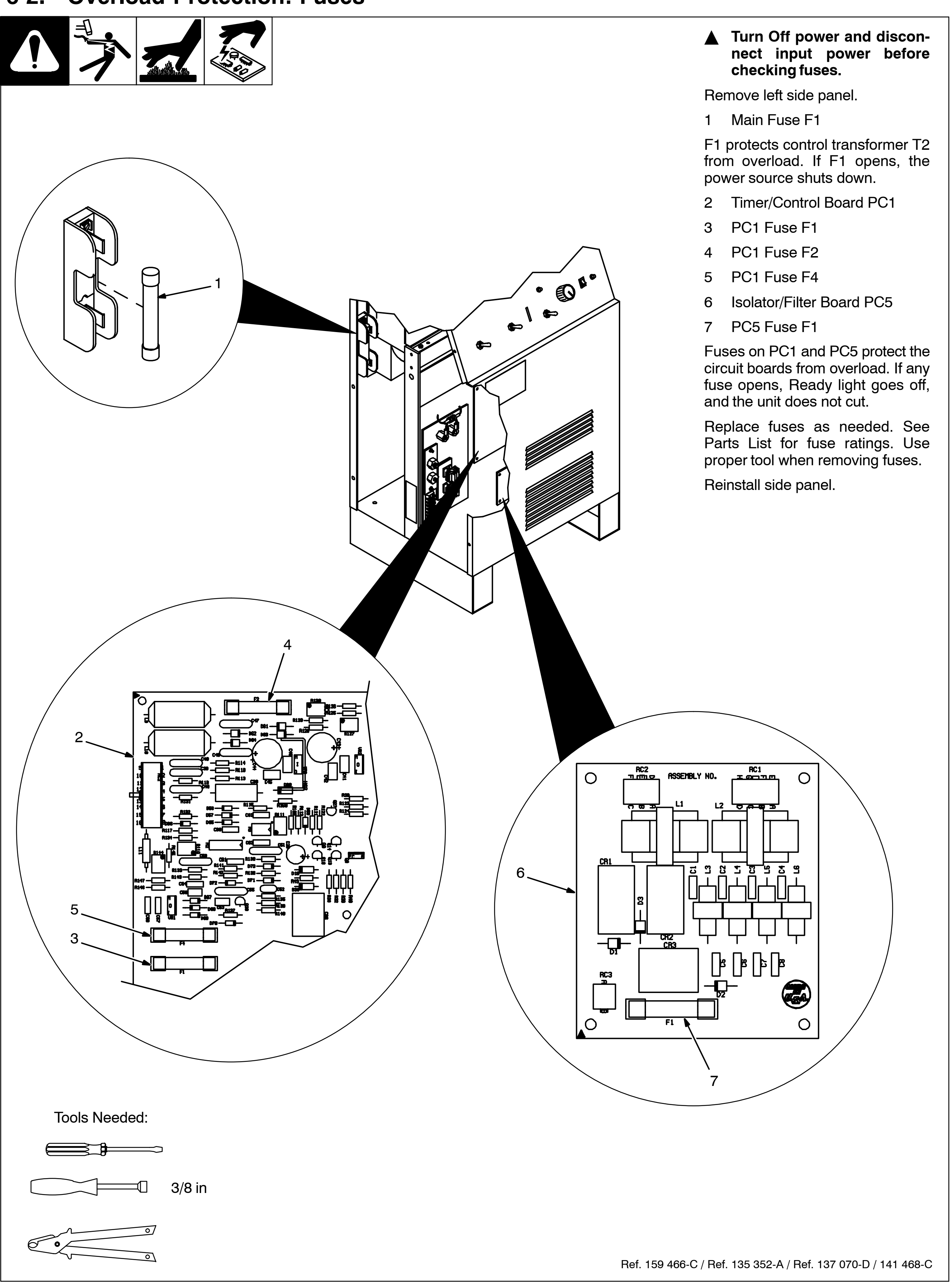
Ref. 159 465-A / 800 701 / S-0818

SECTION 6 – MAINTENANCE & TROUBLESHOOTING

6-1. Routine Maintenance



6-2. Overload Protection: Fuses



▲ **Turn Off power and disconnect input power before checking fuses.**

Remove left side panel.

1 Main Fuse F1

F1 protects control transformer T2 from overload. If F1 opens, the power source shuts down.

2 Timer/Control Board PC1

3 PC1 Fuse F1

4 PC1 Fuse F2

5 PC1 Fuse F4

6 Isolator/Filter Board PC5

7 PC5 Fuse F1

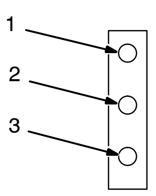
Fuses on PC1 and PC5 protect the circuit boards from overload. If any fuse opens, Ready light goes off, and the unit does not cut.

Replace fuses as needed. See Parts List for fuse ratings. Use proper tool when removing fuses.

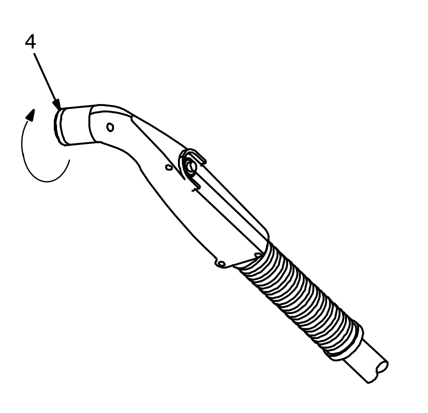
Reinstall side panel.

6-3. Overload Protection: Trouble Lights & Checking Shield Cup Shutdown System





Checking Torch Shield Cup Shutdown System



If certain problems occur, the Ready light goes off, a trouble light comes on, and output stops.

1 Gas/Air Or Shield Cup Light

Lights if low gas/air pressure occurs, if shield cup is loose, or if o-ring is defective.

Turn power Off, and check shield cup connection (see torch Owner's Manual). Check for proper gas/air pressure (see Section 5-1).

Check shield cup shutdown system once a week as shown.

2 Torch-To-Tip Short Light

Lights if a short exists between tip and electrode. Check tip and electrode (see torch Owner's Manual).

3 Temperature Light

Lights if power source overheats (see Section 4-2).

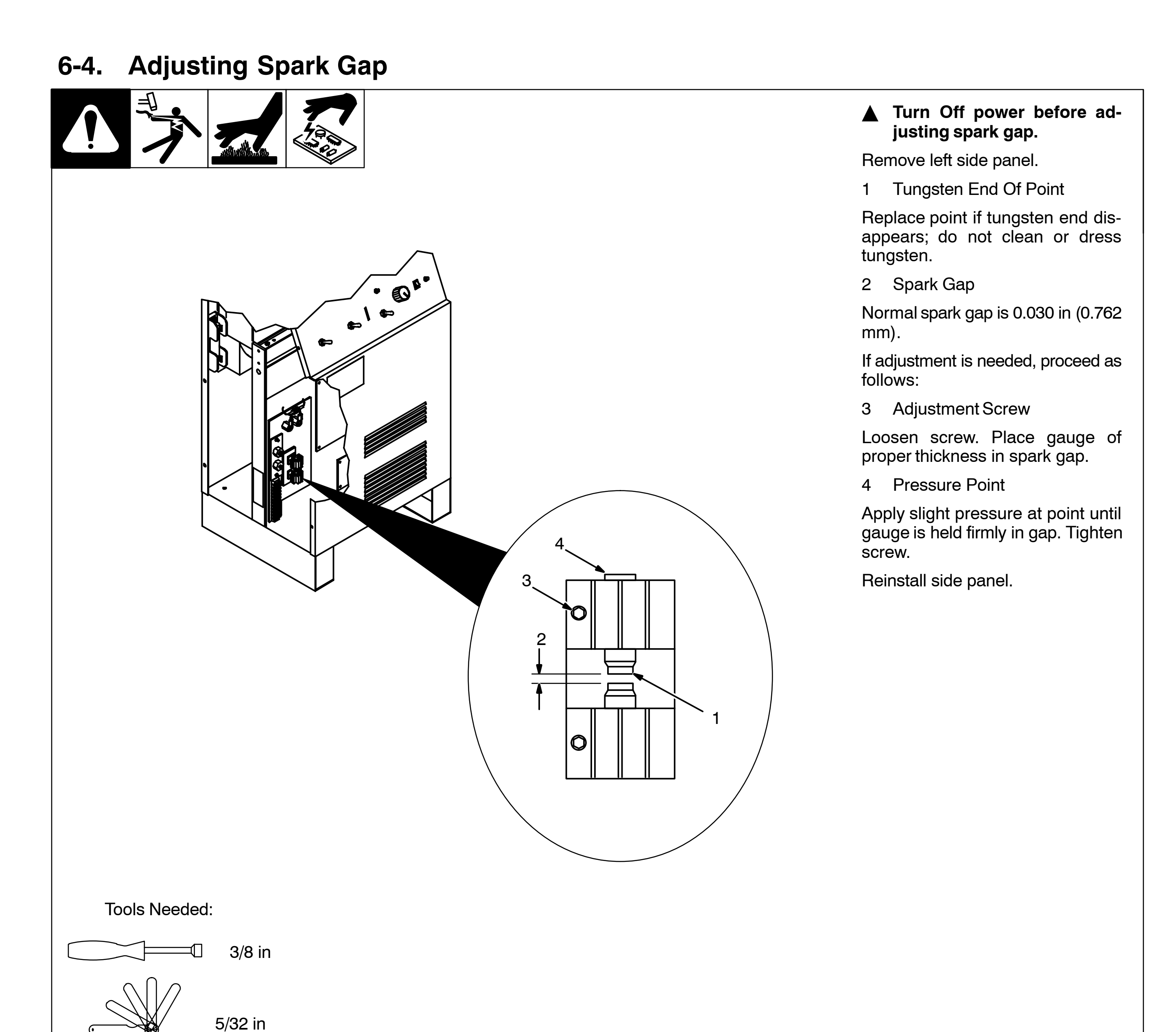
4 Torch Shield Cup

Turn Power On and loosen shield cup. If shutdown system works properly, Ready light goes off and Gas/Air Or Shield Cup light comes on. If not, turn power Off and check for proper gas/air pressure (see Section 5-1), blocked or leaking hose, or loose shield cup (see torch Owner's Manual).

If system works properly, retighten cup and turn Off power.

Ref. 800 713

6-4. Adjusting Spark Gap



▲ **Turn Off power before adjusting spark gap.**

Remove left side panel.

1 Tungsten End Of Point

Replace point if tungsten end disappears; do not clean or dress tungsten.

2 Spark Gap

Normal spark gap is 0.030 in (0.762 mm).

If adjustment is needed, proceed as follows:

3 Adjustment Screw

Loosen screw. Place gauge of proper thickness in spark gap.

4 Pressure Point

Apply slight pressure at point until gauge is held firmly in gap. Tighten screw.

Reinstall side panel.

Tools Needed:

3/8 in

5/32 in

0.030 in (0.762 mm)

Ref. 159 466-C / S-0201

6-5. Torch And Work Cable Connections

▲ **Turn Off power before removing side panel.**

If torch or work cable needs to be removed or replaced, remove left side panel, and proceed as follows:

1 Work Cable

2 Work (+) Output Terminal

3 Torch Cable

4 Pilot Cable

5 Torch (−) And Gas/Air Output Connector

6 Pilot (+) Output Terminal

Connect cables as shown.

7 Terminal Strip 1T

8 Connection Label

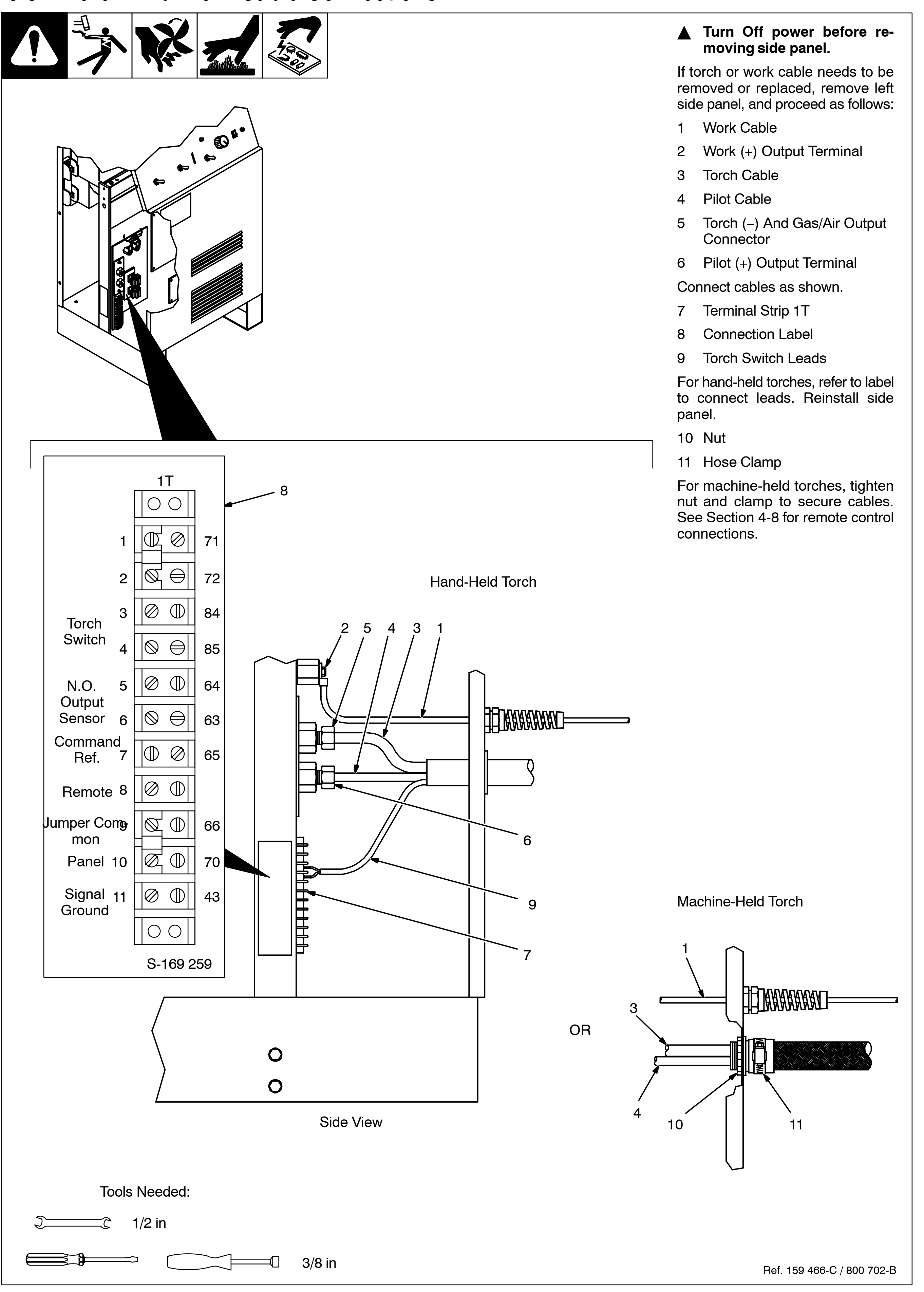
9 Torch Switch Leads

For hand-held torches, refer to label to connect leads. Reinstall side panel.

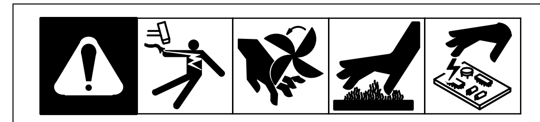
10 Nut

11 Hose Clamp

For machine-held torches, tighten nut and clamp to secure cables. See Section 4-8 for remote control connections.

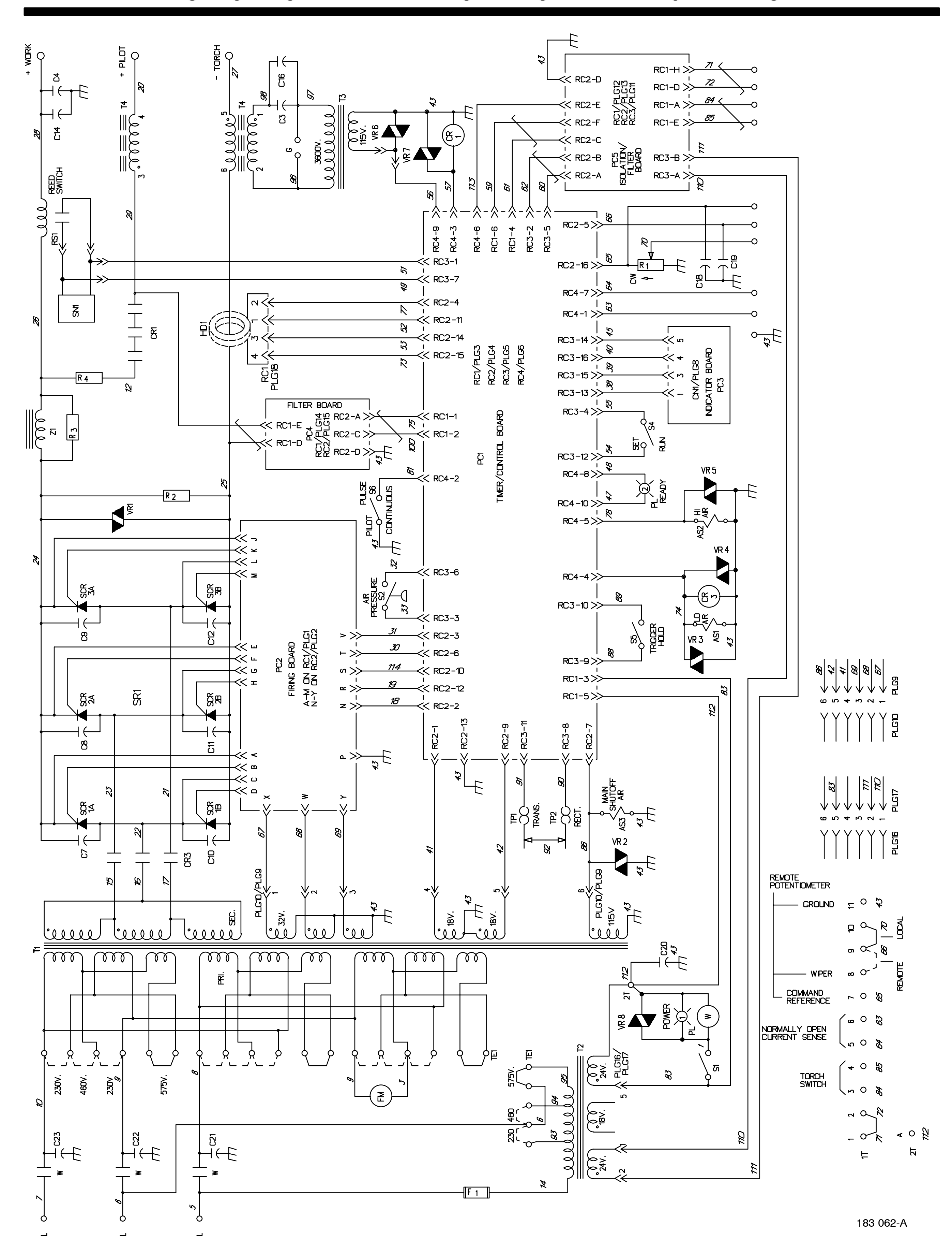


6-6. Troubleshooting



Trouble	Remedy
No cutting output; Power light off; Trouble lights off; Ready light off; fan motor FM does not run.	Place Power switch in On position.
	Place line disconnect device in On position (see Section 4-10).
	Check line fuse(s) and replace if needed or reset circuit breakers (see Section 4-10).
	Check main fuse F1 and replace if needed (see Section 6-2).
	Have Factory Authorized Service Agent check contactor W.
No cutting output; Power light on; Ready light on; Trouble lights off; fan motor FM running.	Be sure work clamp is connected.
	Check for proper torch switch lead connections (see Sections 4-8 and 6-5).
	Check for for proper position of jumper link on terminal strip 1T (see Section 4-8).
	Have Factory Authorized Service Agent check contactor W, control relay CR3, and firing board PC2.
No cutting output; Power light on; Ready light off; Trouble lights off; fan motor FM running.	Check fuses on timer/control board PC1 and isolator/filter board PC5 (see Section 6-2).
	Have Factory Authorized Service Agent check timer/control board PC1.
No control of output.	Check for for proper position of jumper link on terminal strip 1T (see Sections 4-8).
	Have Factory Authorized Service Agent check Output control R1, timer/control board PC1, hall device HD1, and firing board PC2.
No gas/air flow; Power light on; Ready light on; Trouble lights off; fan motor FM running.	Check fuses on timer/control board PC1 and isolator/filter board PC5 (see Section 6-2).
	Check for proper torch connections (see torch Owner's Manual).
No gas/air flow; Power light on; Ready light off; Trouble lights off; fan motor FM running.	Check fuses on timer/control board PC1 and isolator/filter board PC5 (see Section 6-2).
No pilot arc or high frequency; difficulty in establishing an arc.	Check fuses on timer/control board PC1 and isolator/filter board PC5 (see Section 6-2).
	Check and adjust spark gap, if needed (see Section 6-4).
	Check for damaged torch or torch cable (see torch Owner's Manual).
	Have Factory Authorized Service Agent check control relay CR1, timer/control board PC1, and firing board PC2.
Erratic pilot arc, difficulty in establishing an arc, and lowered cutting capacity.	Check for excessive moisture and/or contaminants in gas/air supply.
	Check for dirty air filter/regulator and clean, if needed (see manufacturer's instructions).
Gas/Air Or Shield Cup Trouble light on; Ready light off.	Place Set/Run switch in Run position.
	Check for sufficient gas/air supply pressure and correct gas/air pressure adjustment (see Section 5-1).
	Check torch shield cup and o-ring (see torch Owner's Manual).
	Check for dirty air filter/regulator and clean, if needed (see manufacturer's instructions).
	Have Factory Authorized Service Agent check timer/control board PC1.
Torch-To-Tip Short Trouble light on; Ready light off.	Check to make sure torch electrode is not touching tip inside the torch (see torch Owner's Manual).
	Check to make sure torch lead connections are tight on terminal strip 1T (see Sections 4-8 and 6-5).

Trouble	Remedy
Temperature Trouble light on; Ready light off.	Thermostat TP1 and/or TP2 open (overheating). Allow fan to run; the thermostat closes when the unit has cooled (see Section 4-2).
	Have Factory Authorized Service Agent check timer/control board PC1.
No high gas/air flow (cutting air), or decreased cutting ability.	Check for sufficient gas/air supply pressure and correct gas/air pressure adjustment (see Section 5-1).
	Have Factory Authorized Service Agent check reed switch RS1, high air solenoid AS2, and air circuitry.
Fan motor FM does not run; Power light and Ready light both on.	Check fan motor connections.
Trouble lights not working.	Have Factory Authorized Service Agent check indicator board PC3 and timer/control board PC1.
Power light on; Trouble lights on; cutting output available.	Have Factory Authorized Service Agent check timer/control board PC1.



183 062-A

Figure 7-1. Circuit Diagram For 60 Hertz Power Sources

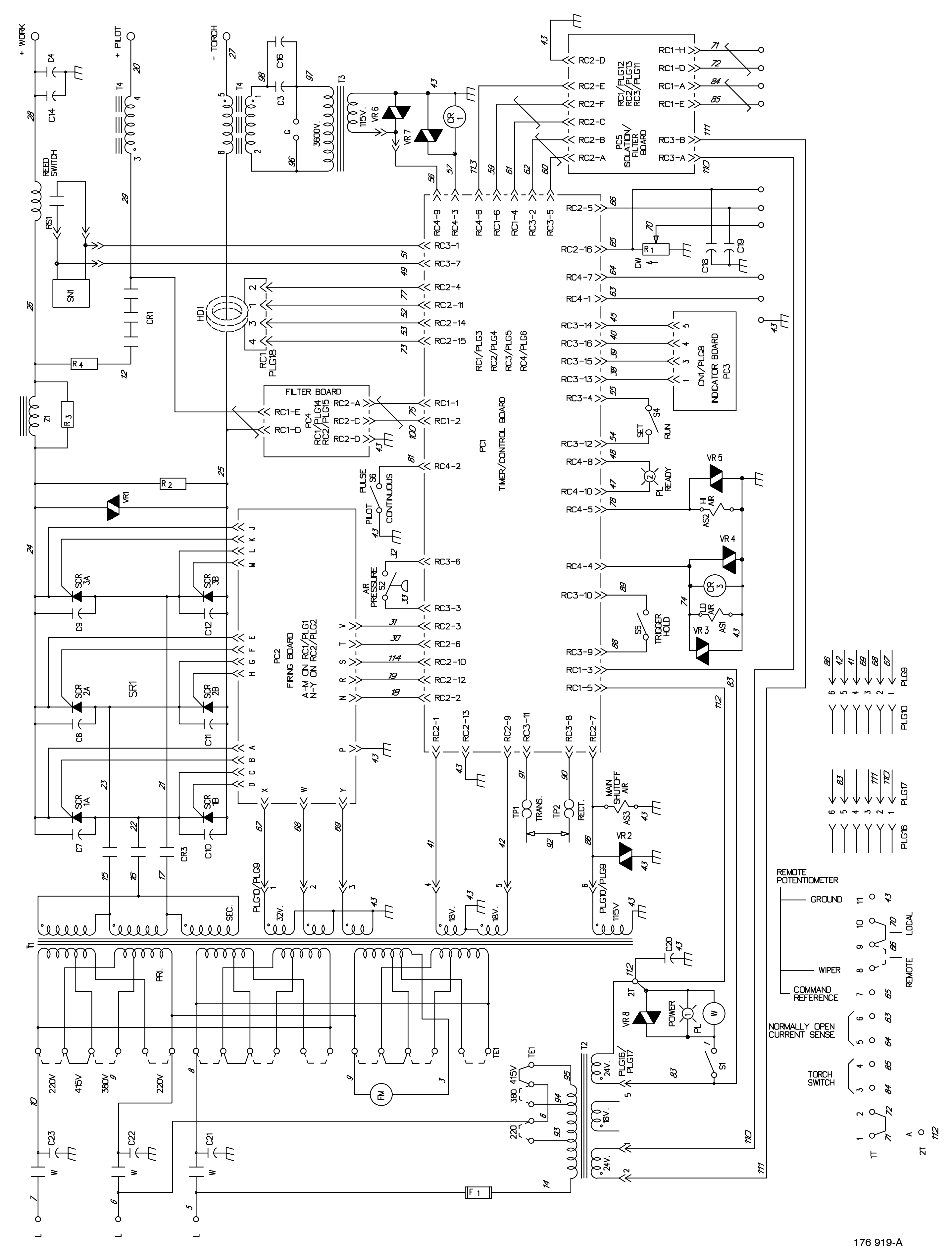
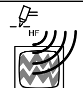


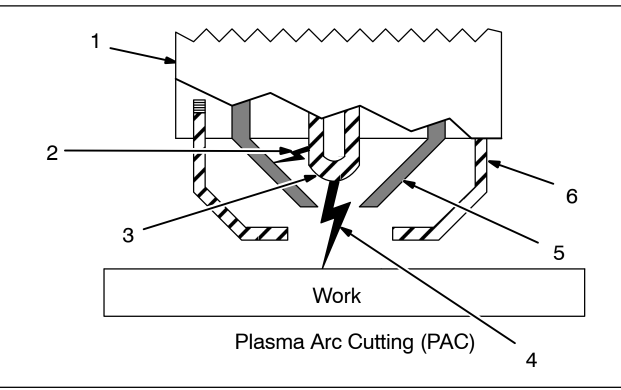
Figure 7-2. Circuit Diagram For 50 Hertz Power Sources

SECTION 8 – HF IN PLASMA CUTTING

8-1. High Frequency In Plasma Arc Cutting (PAC)







Plasma Arc Cutting (PAC)

1 Plasma Arc Torch

2 High-Frequency Voltage

Used inside torch to ionize gap between electrode and tip to help start the pilot arc.

3 Electrode

4 Pilot Arc

5 Tip

6 Shield Cup

high_freq2 4/95 – S-0753

8-2. Sources Of High-Frequency Radiation From Incorrect Installation

Cutting Zone

11, 12

50 ft
(15 m)

S-0754

Sources Of Direct High-Frequency Radiation

1 High-Frequency Source (Plasma Arc Cutting Power Source)

2 Cables

3 Torch

4 Work Clamp

5 Workpiece

6 Work Table

Sources Of Conduction Of High Frequency

7 Input Power Cable

8 Line Disconnect Device

9 Input Supply Wiring

Sources Of Reradiation Of High Frequency

10 Ungrounded Metal Objects

11 Lighting

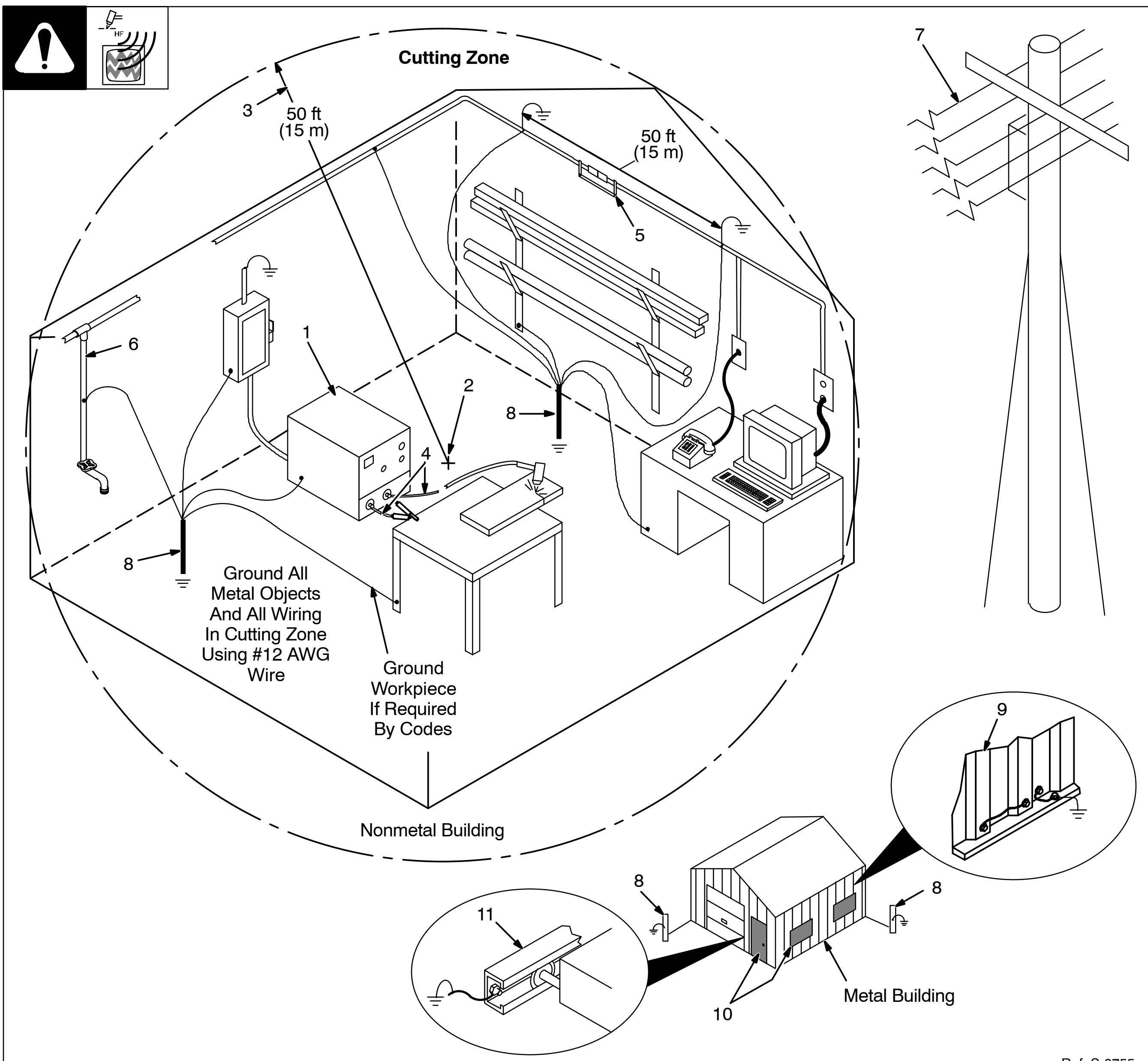
12 Wiring

13 Water Pipes And Fixtures

14 External Phone And Power Lines

8-3. Correct Installation

A. Worksite Requirements



Ref. S-0755

1 Plasma Arc Cutting Source

Ground metal machine case, line disconnect device, input supply, and workpiece (if required).

2 Center Point Of Cutting Zone

Midpoint between high-frequency source and cutting torch.

3 Cutting Zone

A circle 50 ft (15 m) from center point in all directions.

4 Torch And Work Cables

Keep cables close together.

5 Conduit Joint Bonding And Grounding

Electrically join (bond) all conduit sections using copper straps or braided wire. Ground conduit every 50 ft (15 m).

6 Water Pipes And Fixtures

Ground water pipes every 50 ft (15 m).

7 External Power Or Telephone Lines

Locate high-frequency source at least 50 ft (15 m) away from power and phone lines.

8 Grounding Rod

Consult the National Electrical Code for specifications.

Metal Building Requirements

9 Metal Building Panel Bonding Methods

Bolt or weld building panels together, install copper straps or braided wire across seams, and ground frame.

10 Windows And Doorways

Cover all windows and doorways with grounded copper screen of not more than 1/4 in (6.4 mm) mesh.

11 Overhead Door Track

Ground the track.

SECTION 9 – PARTS LIST

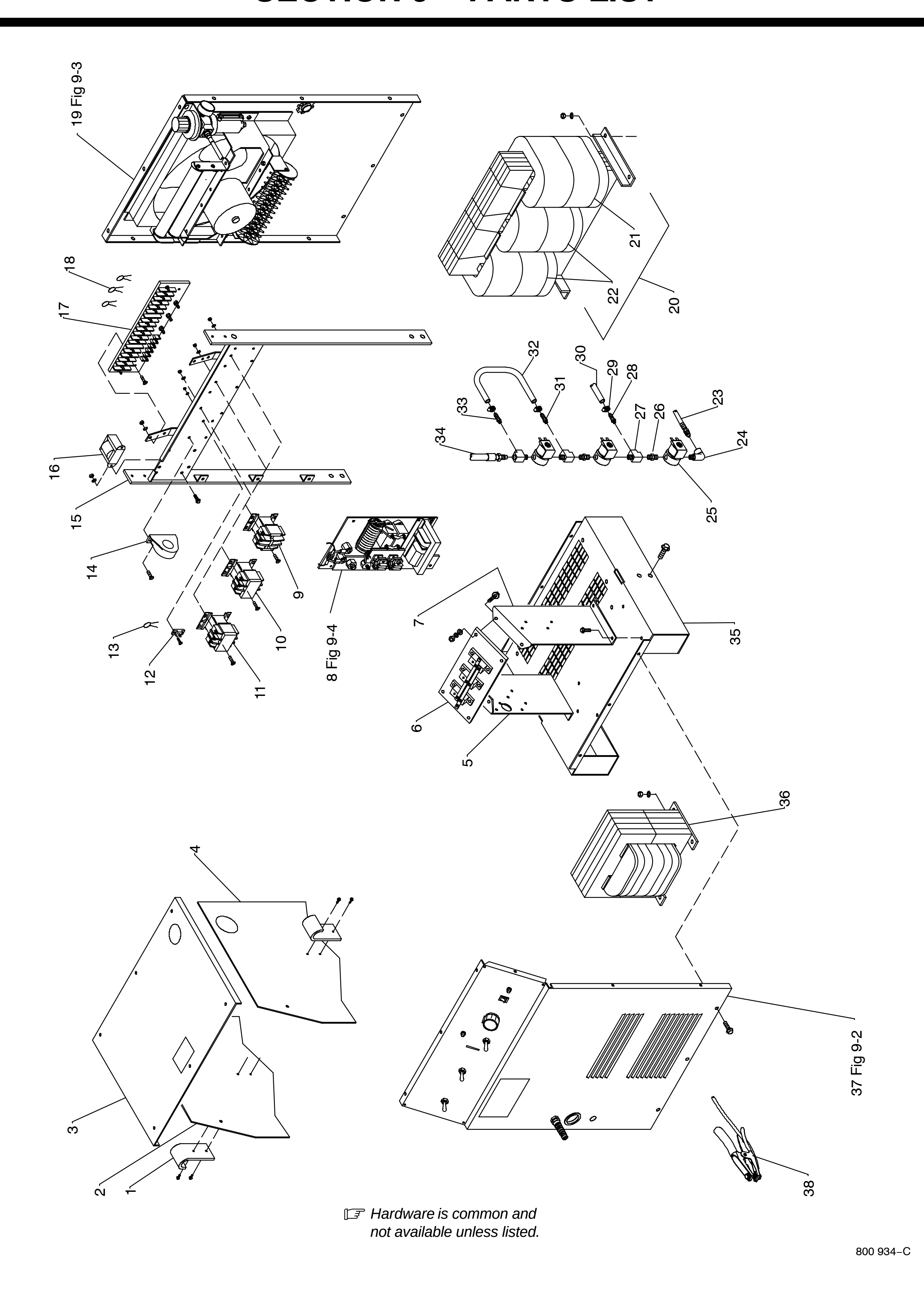


Figure 9-1. Main Assembly

Replace Coils at Factory or Authorized Factory Service Station

Item No.	Dia. Mkgs.	Part No.	Description	Quantity

Figure 9-1. Main Assembly

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
1		015 531	.. HOOK, lift	1
2		132 940	.. PANEL, side LH	1
3		168 943	.. COVER, top	1
4		192 404	.. PANEL, side RH	1
5		126 700	.. BRACKET, mtg heatsink LH	1
6	SR1	170 831	.. RECTIFIER, main (consisting of)	1
	SCR1-3	168 065	.... POWER BLOCK, thyristor 55A 1200PIV	3
		112 250	.... FOIL, interface heat transfer	3
		173 625	.... HEAT SINK, rectifier	1
		170 830	.... HEAT SINK, rect	3
	TP2	129 552	.... THERMOSTAT, NC	1
		126 495	.... BUS BAR	2
	C7-12	127 082	.... CAPACITOR	6
	VR1	105 779	.... VARISTOR	1
7		126 701	.. BRACKET, mtg heatsink RH	1
8		169 882	.. HF PANEL, (Fig 9-4)	1
9	CR1	188 633	.. CONTACTOR, def prp 40A 3P 120V	1
		181 014	.. LINK, connecting contactor term	2
10	W	188 634	.. CONTACTOR, def prp 60A 3P 24V	1
11	CR3	186 355	.. CONTACTOR, def prp 60A 3P 120VAC coil	1
12	2T	072 253	.. STUD, connection single 10-32 x .500 x 1.250	1
13	C20	031 688	.. CAPACITOR, cer disc .01uf 1000VDC	1
		010 913	.. WASHER, flat brs .218 ID x .460 OD x .031thk	1
		601 835	.. NUT, brs hex 10-32	1
14	HD1	177 453	.. TRANSDUCER, current 200A	1
	PLG18	115 094	.. CONNECTOR & SOCKETS, (consisting of)	1
		113 746	.... CONNECTOR, rect skt 24-18ga	4
15		168 850	.. FRAME, center base	1
16	T2	174 308	.. TRANSFORMER, kVA 1/3 24-24 (200/230/460)	1
16	T2	174 304	.. TRANSFORMER, kVA 1/3 24-24 (230/460/575)	1
16	T2	174 306	.. TRANSFORMER, kVA 1/3 24-24-18 (220/380/415)	1
17	TE1	038 126	.. TERMINAL ASSEMBLY, pri 3ph 3V (200/230/460) (consisting of)	1
17	TE1	168 854	.. TERMINAL ASSEMBLY, pri 3ph 3V (230/460/575) (consisting of)	1
		601 835	.... NUT, brs hex 10-32 reg	As Reqd
		038 058	.... TERMINAL BOARD, pri	1
		038 887	.... STUD, pri bd brs 10-32 x 1.375	23
		010 913	.... WASHER, flat brs .218 ID x .460 OD x .031thk	23
		038 618	.... LINK, jumper term bd pri	7
		601 836	.... NUT, brs hex .250-20 jam hvy	6
		010 915	.... WASHER, flat brs .250 ID x .625 OD x .031thk	6
		038 888	.... STUD, pri bd brs .250-20 x 1.500	3
18	C21-23	091 141	.. CAPACITOR, cer disc. .0022uf 3000VAC	3
19		Fig 9-3	.. PANEL, rear w/components	1
20	T1	150 311	.. TRANSFORMER, pwr main 200/230/460 (consisting of)	1
21		149 734	.... COIL, pri/sec 200/230/460 LH	1
22		131 559	.... COIL, pri/sec 200/230/460 (center & RH)	2
20	T1	150 310	.. TRANSFORMER, pwr main 230/460/575 (consisting of)	1
21		149 736	.... COIL, pri/sec 230/460/575 LH	1
22		135 984	.... COIL, pri/sec 230/460/575 center & RH	2
20	T1	176 914	.. TRANSFORMER, pwr main 220/380/415 (consisting of)	1
21		176 915	.... COIL, pri/sec 220/380/415 LH	1
22		176 916	.... COIL, pri/sec 220/380/415 center & RH	2
	TP1	119 581	.. THERMOSTAT, NC	1
23		168 944	.. HOSE, air 36 in	1

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
			Figure 9-1. Main Assembly	
24		010 296	FITTING, hose brs elb M 1/4NPT x .625-18RH	1
25	AS1-3	003 538	VALVE, 115VAC 2 way 1/4 IPS port 1/8orf	3
	VR2-5,7,8	186 491	VARISTOR, w/terminals	1
26		010 830	FITTING, piped brs nipple hex 1/4NPT	2
27		071 270	FITTING, pipe brs tee st 1/4NPT	3
28		169 688	FITTING, brs barbed M 3/16tbg x 1/4NPT	1
29		010 323	CLAMP, hose .250-.625clp dia	3
30		222 211	HOSE, air 40 in	1
31		602 958	FITTING, brs barbed M 1/4tbg x 1/4NPT	1
32		161 860	HOSE, SAE .250 ID x .500 OD	1
33		161 308	FITTING, brs barbed M 1/4tbg x 1/4NPT .059 ID	1
34		132 753	HOSE, air 27 in	1
35		168 851	BASE	1
36	Z1	139 709	STABILIZER	1
37		Fig 9-2	PANEL, front w/components	1
38		170 826	CABLE, work 30 ft no 4 w/clamp strain rlf & term	1
		213 619	CLAMP, work 300 amp stl chrome pld w/cop contacts	1
		213 620	CONTACT TIP, work clamp 300 amp copper	2

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

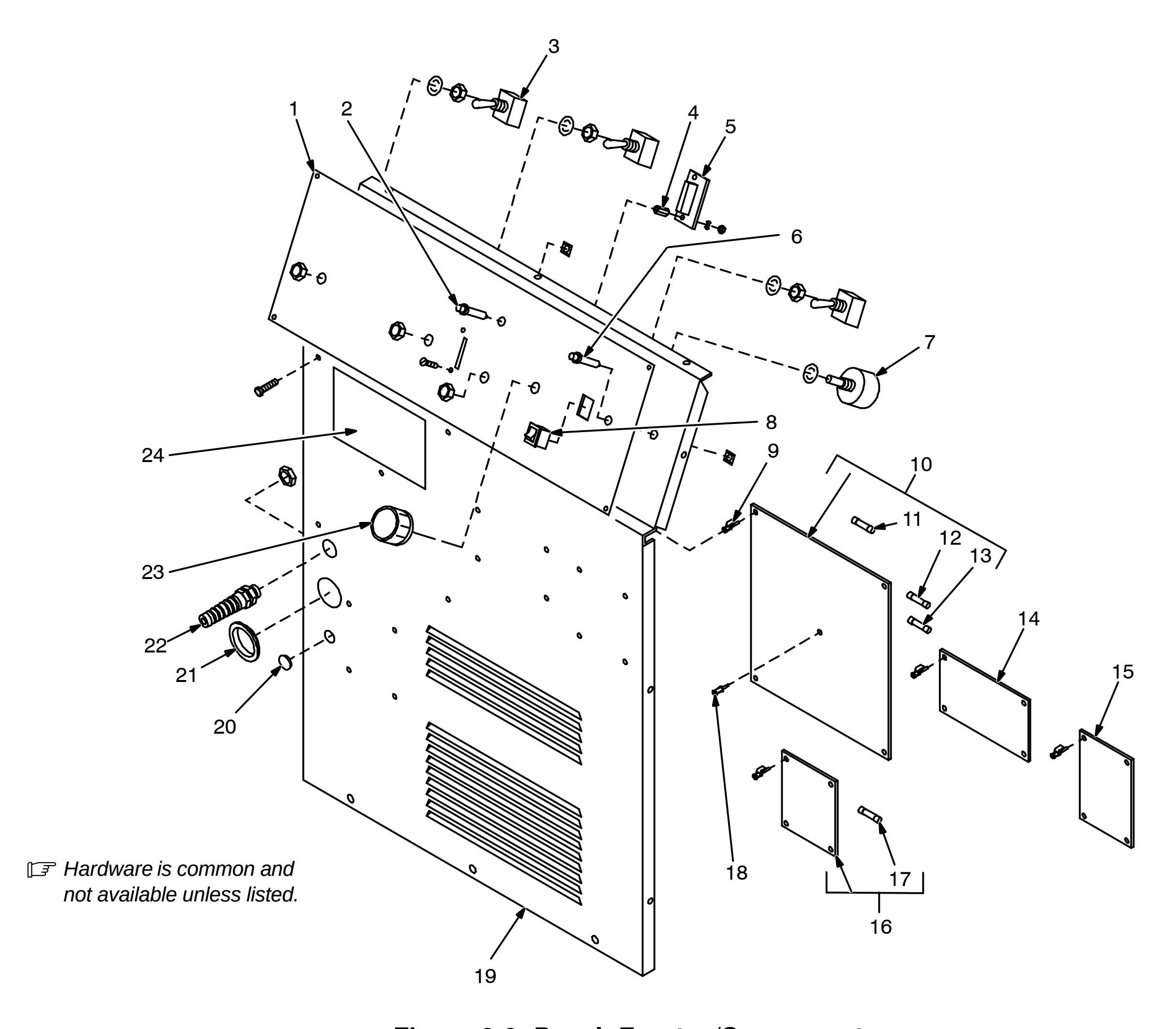


Figure 9-2. Panel, Front w/Components

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
			Figure 9-2. Panel, Front w/Components (Fig 9-1 Item 37)	
1			NAMEPLATE, (order by model and serial number)	1
2	PL2	125 521	LIGHT, ind grn lens 28V snap mtg	1
3	S4-6	089 085	SWITCH, tgl SPST 20A 125VAC	3
4		115 443	STAND-OFF, 6-32 x .750 lg	2
5	PC3	165 552	CIRCUIT CARD, display	1
	PLG8	134 859	CONNECTOR & SOCKETS, (consisting of)	1
		125 748	CONNECTOR, rect skt 22-18ga JST SVH-21T-1.1	6
6	PL1	157 958	LIGHT, ind white lens 28V snap mtg	1
7	R1	035 897	POTENTIOMETER, CP std slot 1/T 2W 1K linear	1
8	S1	111 997	SWITCH, rocker SPST 10A 250VAC	1
9		110 375	STAND-OFF SUPPORT, PC card No. 6 screw	16
10	PC1	188 871	CIRCUIT CARD, control (consisting of)	1
11	F2	*012 633	FUSE, mintr gl 1A	1
12	F4	*012 663	FUSE, mintr gl slo-blo 3A	1
13	F1	*012 653	FUSE, mintr gl .5A	1
	PLG3	115 093	CONNECTOR & SOCKETS, (consisting of)	1
		113 746	CONNECTOR, rect skt 24-18ga Molex 39-00-0038	6
	PLG4,5	131 052	CONNECTOR & SOCKETS, (consisting of)	2
		113 746	CONNECTOR, rect skt 24-18ga Molex 39-00-0038	16
	PLG6	115 091	CONNECTOR & SOCKETS, (consisting of)	1
		113 746	CONNECTOR, rect skt 24-18ga Molex 39-00-0038	10
14	PC2	097 772	CIRCUIT CARD, SCR firing circuit (60 Hz)	1
14	PC2	107 510	CIRCUIT CARD, SCR firing circuit (50 Hz)	1

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
			Figure 9-2. Panel, Front w/Components (Fig 9-1 Item 37)	
	PLG1	081 379	CONNECTOR, rect 12skt plug Amp 1-87159-2	1
		081 378	CONNECTOR, rect skt 22-18ga Amp 102100-2	12
	PLG2	090 469	CONNECTOR, rect 10skt plug Amp 1-87159-0	1
		081 378	CONNECTOR, rect skt 22-18ga Amp 102100-2	10
15	PC4	162 880	CIRCUIT CARD, filter	1
	PLG14	115 092	CONNECTOR & SOCKETS, (consisting of)	1
		113 746	CONNECTOR, rect skt 24-18ga Molex 39-00-0038	8
	PLG15	115 093	CONNECTOR & SOCKETS, (consisting of)	1
		113 746	CONNECTOR, rect skt 24-18ga Molex 39-00-0038	6
16	PC5	141 467	CIRCUIT CARD, isolator/filter (consisting of)	1
17	F1	*012 653	FUSE, mintr gl .5A	1
	PLG11	131 054	CONNECTOR & SOCKETS, (consisting of)	1
		113 746	CONNECTOR, rect skt 24-18ga Molex 39-00-0038	2
	PLG12	115 092	CONNECTOR & SOCKETS, (consisting of)	1
		113 746	CONNECTOR, rect skt 24-18ga Molex 39-00-0038	8
	PLG13	115 093	CONNECTOR & SOCKETS, (consisting of)	1
		113 746	CONNECTOR, rect skt 24-18ga Molex 39-00-0038	6
18		126 368	STAND-OFF SUPPORT, PC card No. 6 screw	1
19		+180 170	PANEL, front	1
20		024 376	BLANK, snap-in nyl .625mtg hole	1
21		170 647	BUSHING, snap-in nyl 1.312 ID x 1.500mtg hole	1
22		134 900	STRAIN, relief cable flexible .270-.480 cable	1
23		171 007	KNOB, pointer	1
24		136 156	LABEL, warning precautionary plasma cutting equipment	1

*Recommended Spare Parts.

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

Item No.	Dia. Mkgs.	Part No.	Description	Quantity

Figure 9-3. Panel, Rear w/Components (Fig 9-1 Item 19)

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
1	R2,3	126 736	RESISTOR, WW fxd 375W 20-161 ohm dual	1
2	F1	*604 259	FUSE, crtg 3A 600V one time	1
3		070 404	HOLDER, fuse crtg	1
4		032 611	BLADE, fan 14 in 3wg 23deg .375 bore CCW	1
5		192 402	PANEL, rear	1
6		168 944	HOSE, air 36 in	1
7		192 399	REGULATOR/FILTER, 250PSIG in 0-150PSIG out 1/4NPT	1
8		168 945	BRACKET, mtg air filter/regulator	1
9		168 252	NUT, knrl .187-12	1
10		169 260	GASKET, neoprene 3.000 OD x 1.250 ID x .500	1
11		117 125	GAUGE, air 0-160psi 1/4NPT	1
12		188 962	HOSE, vinyl braided .125 ID x .312 OD	1
13		015 733	FITTING, pipe brs nipple L 1/4NPT x 2.000	1
14		602 963	FITTING, pipe brs coupling 1/4NPT	1
15		044 426	CONNECTOR, clamp cable .690/1.070	1
16		131 361	CHAMBER, plenum 14 in	1
17	R4	181 631	RESISTOR, w/mtg hardware	1
18	FM	116 190	MOTOR, 1/12hp 230V 1550RPM 50/60Hz 1.5A	1
		047 838	BLANK, snap-in nyl 1.000mtg hole	2

☞ *Hardware is common and not available unless listed.*

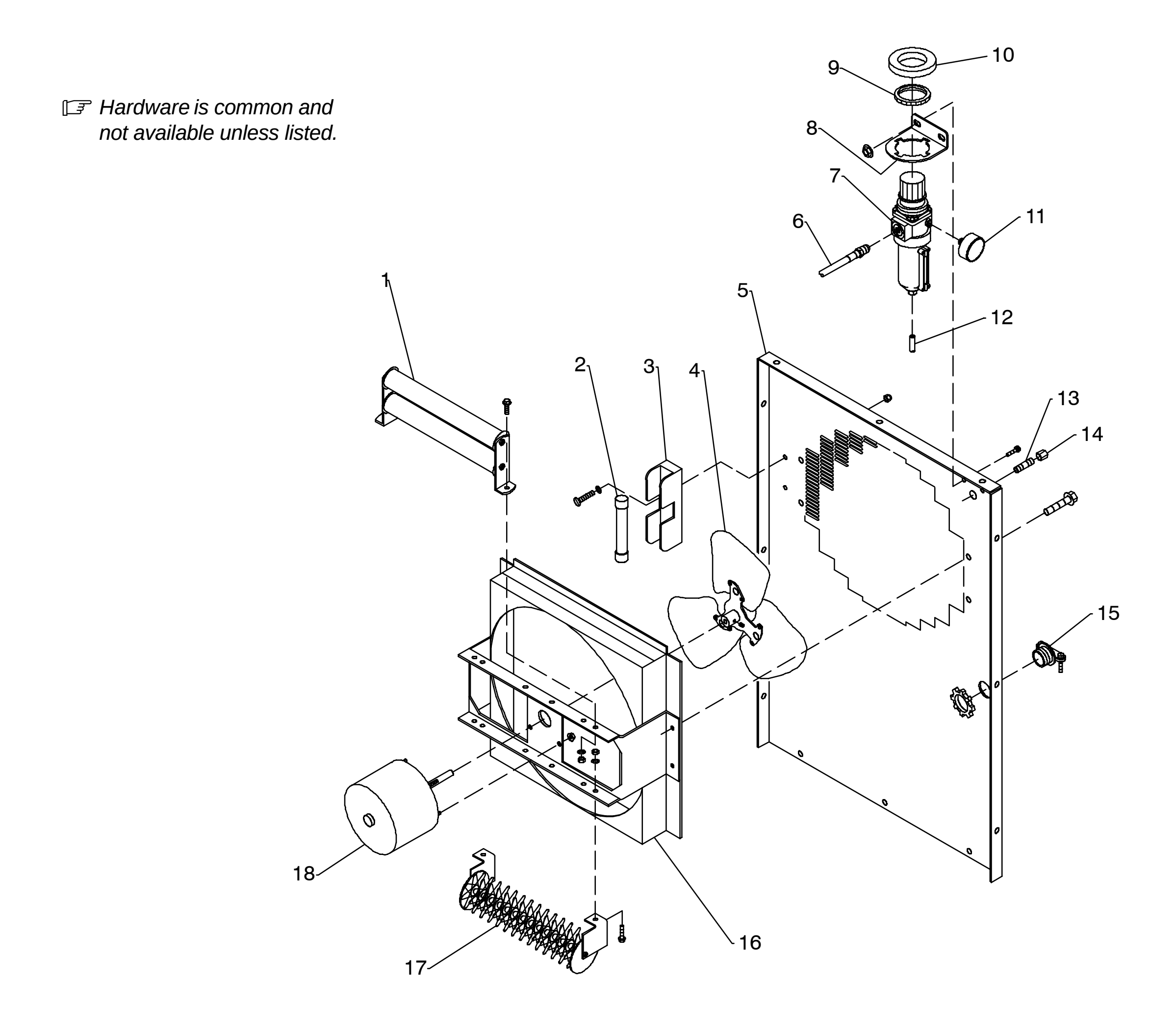


Figure 9-3. Panel, Rear w/Components

*Recommended Spare Parts.

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
		169 882	**Figure 9-4. HF Panel (Fig 9-1 Item 8)**	
1		125 689	FITTING, pipe brs adapter bhd .562-18 x .750-16	1
2		169 883	STRIP, mtg torch	1
3		605 884	NUT, stl hex jam .750-16	2
4		010 604	FITTING, hose brs bushing 1/4NPT x .625-18 RH	1
5		071 270	FITTING, pipe brs tee st 1/4NPT	1
6	S2	168 773	SWITCH, pressure air NO-NC cont adj 45 to 65 PSI	1
7	RS1	125 508	RELAY, reed	1
	VR6	186 505	VARISTOR ASSEMBLY	1
	SN1	186 538	SNUBBER ASSEMBLY	1
8	C4,14	142 133	CAPACITOR	2
9	WORK	026 947	STAND-OFF, insul .250-20 x 1.000 lg x .312thd	2
		038 328	STUD, brs .250-20 x 1.250	1
		601 836	NUT, brs hex .250-20 jam hvy	3
10		175 585	PANEL, mtg HF	1
11		605 538	CABLE TIE, 0-4.500 bundle	2
12		113 146	CABLE TIE MOUNT, for lashing	2
13	T4	162 884	COIL, HF coupling	1
14	C3,16	096 761	CAPACITOR, mica .002uf 10000V	2
15		010 886	STRIP, conductor	2
16	T3	208 045	TRANSFORMER, high voltage 115V pri 3600V sec 30mA	1
17		103 947	TUBING, stl .312 OD x 17ga wall x .937	2
18		113 000	STRIP, mtg spark gap	2
19		020 622	HOLDER, points	2
20	G	*020 603	POINT, spark gap	2
21		010 493	BUSHING, snap-in nyl .625 ID x .875mtg hole	1
22	1T	♦073 586	BLOCK, term 20A 11P	1
		♦601 219	LINK, jumper term blk 20A	1
23	C18,19	♦126 450	CAPACITOR ASSEMBLY	1
24		169 884	FITTING, pipe brs adapter BHD .375-24 x .750-16	1

☞ *Hardware is common and not available unless listed.*

800 937-A

Figure 9-4. HF Panel

*Recommended Spare Parts.

♦Item is not part of HF Panel.

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

Notes

Notes

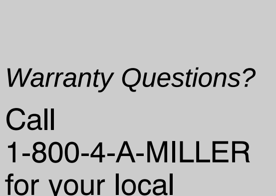
Notes

Notes



Effective January 1, 2004
(Equipment with a serial number preface of “LE” or newer)

This limited warranty supersedes all previous Miller warranties and is exclusive with no other guarantees or warranties expressed or implied.



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LIMITED WARRANTY – Subject to the terms and conditions below, Miller Electric Mfg. Co., Appleton, Wisconsin, warrants to its original retail purchaser that new Miller equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped by Miller. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

Within the warranty periods listed below, Miller will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. Miller must be notified in writing within thirty (30) days of such defect or failure, at which time Miller will provide instructions on the warranty claim procedures to be followed.

Miller shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the date that the equipment was delivered to the original retail purchaser, or one year after the equipment is sent to a North American distributor or eighteen months after the equipment is sent to an International distributor.

1. 5 Years Parts — 3 Years Labor
   * Original main power rectifiers
   * Inverters (input and output rectifiers only)
2. 3 Years — Parts and Labor
   * Transformer/Rectifier Power Sources
   * Plasma Arc Cutting Power Sources
   * Semi-Automatic and Automatic Wire Feeders
   * Inverter Power Sources (Unless Otherwise Stated)
   * Water Coolant Systems (Integrated)
   * Intellitig
   * Maxstar 150
   * Engine Driven Welding Generators
     (NOTE: Engines are warranted separately by the engine manufacturer.)
3. 1 Year — Parts and Labor Unless Specified
   * DS-2 Wire Feeder
   * Motor Driven Guns (w/exception of Spoolmate Spoolguns)
   * Process Controllers
   * Positioners and Controllers
   * Automatic Motion Devices
   * RFCS Foot Controls
   * Induction Heating Power Sources and Coolers
   * Water Coolant Systems (Non-Integrated)
   * Flowgauge and Flowmeter Regulators (No Labor)
   * HF Units
   * Grids
   * Maxstar 85, 140
   * Spot Welders
   * Load Banks
   * Arc Stud Power Sources & Arc Stud Guns
   * Racks
   * Running Gear/Trailers
   * Plasma Cutting Torches (except APT & SAF Models)
   * Field Options
     (NOTE: Field options are covered under True Blue® for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
4. 6 Months — Batteries
5. 90 Days — Parts
   * MIG Guns/TIG Torches
   * Induction Heating Coils and Blankets
   * APT & SAF Model Plasma Cutting Torches
   * Remote Controls
   * Accessory Kits
   * Replacement Parts (No labor)
   * Spoolmate Spoolguns
   * Canvas Covers

Miller’s True Blue® Limited Warranty shall not apply to:

1. **Consumable components; such as contact tips, cutting nozzles, contactors, brushes, slip rings, relays or parts that fail due to normal wear. (Exception: brushes, slip rings, and relays are covered on Bobcat, Trailblazer, and Legend models.)**
2. Items furnished by Miller, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer’s warranty, if any.
3. Equipment that has been modified by any party other than Miller, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

MILLER PRODUCTS ARE INTENDED FOR PURCHASE AND USE BY COMMERCIAL/INDUSTRIAL USERS AND PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT.

In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at Miller’s option: (1) repair; or (2) replacement; or, where authorized in writing by Miller in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized Miller service station; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer’s risk and expense. Miller’s option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at a Miller authorized service facility as determined by Miller. Therefore no compensation or reimbursement for transportation costs of any kind will be allowed.

TO THE EXTENT PERMITTED BY LAW, THE REMEDIES PROVIDED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL MILLER BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT), WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

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Owner's Record

Please complete and retain with your personal records.

Model Name	Serial/Style Number
Purchase Date	(Date which equipment was delivered to original customer.)
Distributor	
Address	
City	
State	Zip



For Service

Contact a DISTRIBUTOR or SERVICE AGENCY near you.

Always provide Model Name and Serial/Style Number.

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Contact the Delivering Carrier to:	File a claim for loss or damage during shipment. For assistance in filing or settling claims, contact your distributor and/or equipment manufacturer's Transportation Department.

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